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PRE-OPERATIONAL SURVEY
IN THE
WESTMINSTER PONDS/POND MILLS
CONSERVATION AREA
RELATIVE TO THE
VICTORIA HOSPITAL ENERGY
FROM WASTE (EFW)
POWER PLANT,
LONDON, ONTARIO, 1984

ARB-125-86-PHYTO

September, 1986

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Ontario
Ministry
of the
Environment

C. E. DUNCAN, Acting Director
Air Resources Branch

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Pre-operational Survey in the Westminster Ponds/Pond Mills Conservation Area Relative to the Victoria Hospital Energy from Waste (EFW) Power Plant, London, Ontario, 1984

Air Resources Branch
Phytotoxicology Section

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1.0 INTRODUCTION

The Westminster Ponds/Pond Mills Conservation Area has long been recognized for its geological, biological and historical features. Naturalist organizations have expressed concern regarding the impact that the Energy from Waste (EFW) Plant, Victoria Hospital, located on Commissioners Road, London and estimated to go on line in 1987 will have on this Conservation Area. The Ministry of the Environment, Phytotoxicology Section, has been assigned the responsibility of assuring the integrity of the area through biomonitoring.

The purpose of the pre-operational study was to characterize the endemic condition of the vegetation in the area. Following completion of the EFW power plan, post-operational surveys could monitor possible adverse environmental effects due to the facilities.

This report describes surveys and pre-operational studies on soil and vegetation that were conducted in 1984. The results for samples submitted to the Trace Elements Laboratory for chemical analyses are included.

2.0 SITE DESCRIPTION

The Westminster Ponds/Pond Mills Conservation Area has been described by Hearn and Wake (1970). The area is located on the south edge of the City of London and extends in an irregularly shaped area about 3.5 x 2 km in size (Figure 1). The study area surrounds two groupings of kettle lakes known as Pond Mills and Westminster Ponds which are connected by Dayus Creek. The area is largely surrounded by residential developments.

The entire area is situated on the Ingersol Moraine and is geologically and botanically interesting. The variety of flora and fauna that exists here are unique within both the City of London and the County of Middlesex.

The Pond Mills area on the eastern edge of the site contains two interconnected kettle lakes. These are encircled by a municipal road and are in close proximity to developed residential lands. The North and South Ponds are the largest natural water bodies in the London area.

The Dayus Creek is a ravine which connects the Westminister Ponds and Pond Mills area. The valley is made up of the north-westerly flowing Dayus Creek, a substantial kettle lake known as Thompson's Pond, and several low-lying marshy spots and ponds.

The Westminster Ponds include Saunder's Pond, South Walker's Pond and Spettigue's Pond in the western and central portions of the site. These kettle lakes of glacial origin are set amidst the hummocky topography of the Ingersol Moraine. The ridges between the ponds are covered with a diverse combination of woodland and meadow. The forest is composed largely of maple, beech and oak, but also contains many birch and hickory.

The area immediately around Spettigue's Pond is exceptionally interesting as it contains many rare "cold climate" plants. Orchids, pitcher plants, sundews, larch trees, and other northern bog plants are found.

A report on the biology of the area was prepared for the Upper Thames River Conservation Authority in 1981 (McLeod). That report divided the area into 11 biological zones. These zones are shown in Figure 2 and can be divided further into smaller ecological units. Comments related to the McLeod report are attached as Appendix 7.1.

Concern was raised that airborne emissions from the proposed EFW operation could have a negative impact on the biological components of the Conservation Area. As part of the process to address this concern, computer assisted projections of air quality in the area were prepared. The zones of maximum plume impingement (Figure 5) generally fall outside of the Conservation Area, however, a secondary zone of possible influence covers the greater part of the Conservation Area.

3.0 SITE STUDIES

3.1 RECONNAISSANCE

A reconnaissance of the Conservation Area was conducted several times during the summer months of 1984. The initial visits were very fruitful in providing familiarity of the zones, the many trails, as well as species distribution and diversity. This familiarity aided in the selection of sites for more detailed studies such as the permanent plot and soil and foilage collection stations. Since the two major ambient air pollutants to be released from the EFW stack are SO_2 and ozone precursors, the location and distribution of SO_2 and ozone-sensitive species were recorded.

More specifically, on August 6, 1984, a site visit was conducted to locate the rare species in the bog zone as well as elsewhere. Suggestions for the location of a permanent plot were also made.

Human activity has had a significant impact on the area. During surveillance visits, this influence on the Conservation Area was noted, especially in areas where easy access was available to the public. Disturbance was observed in the form of many well-used trails, scarring of trees, felling of trees and litter (bottles, papers, etc.). Important as well, is the major impact that established and developing subdivisions are having on the drainage pattern and water table in the Area. An alteration of the water table level could have a major impact on the Conservation Arera ecosystems.

The tolerance of plant species to landfill gases which are being emitted in the meadow area is important (Zone 6). Table 1 lists species which range from tolerant to sensitive to gases released from landfill sites. Basswood, cherry, apple, oak, American elm, sugar maple, shagbark hickory and black walnut are all species common in the Conservation Area which are sensitive to the gases.

Based on the size of the landfill site, the number of vents and the gas odor which was detected during many of the visits, the released landfill gases could possibly affect the sensitive species. In future monitoring, attention should be paid to possible effects from this source.

Finally, past disturbance from grazing by cattle was also apparent. Evidence of fences and gates, which were used at one time to enclose cattle was *observed. Results from the soil analysis indicated a high degree of soil compaction and little ground cover with little or no organic layer in the forested area (Zone 5). Soil compaction, and the lack of an organic layer were noted through the Conservation Arera and are possibly related to the past influence of cattle.*

3.2 RARE AND UNCOMMON SPECIES

During the visit with D. McLeod, areas in the delicate bog ecosystem where rare and uncommon orchids were growing (Spettigues Pond, Zone 5) were selected as permanent observation sites. Seven of the eight native orchids present in this area are uncommon in the county (McLeod, 1981).

During the visit, Habenaria clavellata (Club-spur orchis), Cypripedium acaule (Stemless lady's slipper), Habenaria lacera (Ragged fringed orchis) and Malaxis unifolia (Green adders-mouth) were observed in the bog and adjacent areas. Future visits during the growing season are needed to locate all seven of the uncommon orchids to permit a visual assessment of their status. Locations will be marked for future reference.

List of native orchids recorded in
Westminster Ponds/Pond Mills Conservative Area

Scientific name	***Common name***
Calopogon pulchellus	*Gass pink*
Corallorhiza trifida var. verna	*Early coral-root*
Cypripedium acaule	*Stemless layd's slipper*
Habenaria clavellata	*Club spur orchis*
Habenaria lacera	*Ragged friged orchis*
*Liparis loeselii**	*Loesel's twayblade*
Malaxis unifolia	*Green adder's mouth*
Pogonia ophioglossoides	*Rose pogonia*

* *not on uncommon list*

3.3 VISUAL ASSESSMENT SURVEY FOR VEGETATION INJURY

On August 28, 1984 the Conservation Area was traversed by members of the Phytotoxicology Section in order to examine the vegetation for insect damage, disease, physiological stress, physical damage (human impact) and possible air pollution injury (mainly ozone and sulphur dioxide). White ash was selected as the indicator species for ozone damage and black walnut was used as an indicator of sulphur dioxide injury. Both species were well distributed throughout the study area. Other types of vegetation were examined and assessed for the above-mentioned effects.

A familiarization of the plant species distribution, access routes, location and impact of subdivisions of the area and public impact and usage was obtained through the reconnaissance program.

Two major transects were followed in order to assess air pollution injury, disease and insect pests, and the impact of man on vegetation in the area. The transects included the railway corridor which started at Southdale and Pond Mills Road, crossing the easterly portion of the Conservation Area and terminating at Commissioners Road (Figure 3). A second transect commenced at the permanent plot location north of Spettigue's Pond in Zone 5 terminating directly west at Wellington.

A large number of plant species were examined for ozone and sulphur dioxide injury including wild grape, walnut, apple, ash, eastern white pine, alfalfa, honeysuckle, beech, mulberry, dogwood, cherry, maple, basswood, silver maple with no symptoms being observed. Frost cracks were noted on several of the woody species.

A detailed list of the diseases and insect pests observed on trees and shrubs during the survey is given in Table 2. Several diseases and insect pests occurred in epidemic proportions on plant foliage. Examples include Septoria cornicola and Cercospora cornicola on dogwood; Black knot (Dibotryon morbosum) on sweet and pin cherry; Rust (Gymnosporangium globosum) on hawthorn (Crataegus spp.), and dieback on white ash. This disease on white ash, variously called 'ash decline' or 'yellows' exhibits itself first as emerging yellow green foliage which is abnormally small with branch and twig dieback and stunting. Permature changing of leaf color in the fall may also occur.

3.4 SOIL AND FOLIAGE COLLECTION

In the course of examining the area in the vicinity of the Victoria Hospital, the heterogeniety of the local vegetation became apparent. Dispite this problem 15 sites were identified for establishment of vegetation and soil sampling stations (Figure 4). The initial sampling was carried out on August 28, 1984 when silver maple foliage (Sites 42 and 43) and sugar maple foliage (Sites 44 to 49) as well as soil (0-5 cm) was collected. The vegetation samples from this collection were split into two portions each. One portion was washed and the other remained unwashed. On October 17, foliage of silver maple was collected at Sites 50 to 56. Soil samples were collected at these latter locations and Site 45 on October 26, 1984.

The vegetation samples were ovendried, ground in a Wiley-mill and stored in glass bottles. Soil samples were air-dried pulverized to pass through a 60 mesh seive and stored in glass bottles. The prepared samples were then forwarded to the Ministry laboratory on Resources Road, Downsview for analysis for antimony, arsenic, cadmium, calcium, chloride, chrominium, copper, fluoride, iron, lead, magnesium, manganese, molybdenum, nickel, selenium, sodium, sulphur, vanadium and zinc.

The analytical results for the vegetation and soil samples are presented in Tables 3 to 21. For the majority of samples, the concentrations of the respective elements were within the range considered to be normal for an urban area. The following comments are restricted to samples with an unusually high content of the indicated element.

Soil at Site 52 contained antimony at a concentration higher than at any other location. Soils at Sites 42, 51, 53 and 55 contained high amounts of calcium, however this may not be unusual given the high clay content of soils in the area. Silver maple at Site 55 contained higher than background concentrations of copper. Soil at 4 Sites (42, 43, 47 and 50) contained higher than background concentrations of selenium, however, since these sites are somewhat dispersed, the selenium values may reflect the composition of the soil parent material. The soil at Site 43 also contained elevated amounts of sulphur.

In summary, vegetation and soil samples were collected late in the growing season of 1984. For the most part, the samples collected contained normal concentrations of the respective elements. A few samples at isolated *locations contained concentrations of several elements marginally above background levels, however no local source of these elements was noted.*

3.5 *MOSS BAG SURVEY*

Moss has long been used by investigators to map zones of heavy metal contaminaiton around point sources of atmospheric pollution. This is possible, due to the ability of moss to sorb and retain airborne trace elements from wet and dry deposition. These properties have been employed by the Phytotoxicology Section of the Ontario Ministry of the Environment in developing moss bags as a tool to define zones of atmospheric contamination around various types of industrial sources (Temple et al., 1981).

A moss bag network was established on July 27, 1984 at 41 stations in the vicinity of the Victoria Hospital (Figure 5). Results obtained from these monitors will assist in correlating future aerial deposition from the EFW Plant with foliar uptake of lead, cadmium, chromium, nickel, iron, manganese, zinc, copper, arsenic, antimony, selenium, sulphur, mercury and chloride (Figure 4 and Table 1). Moss bags were exchanged regularly on a 30-day basis with the last exposure day being October 29, 1984.

Moss bags were brought back to the Phytotoxicology laboratory and prepared for chemical analyses using standardized laboratory procedures. Samples were then analyzed for elements (listed above) by the Inorganic Trace Contaminants Section, Laboratory Services Branch of the Ontario Ministry of the Environment.

The analytical results for moss exposed in moss bags in the summer of 1984 are presented in Tables 22 to 40. Generally, the values for all elements are within the range considered to be normal for moss exposed in an urban environment not associated with a point source of contaminants. Comments which follows apply to unusually high values for the respective elements and no further comments are made concerning normal values.

Arsenic values in excess of normal background (25 u/g) were recorded at Site 30 in August (Table 23). There was no obvious source of contamination at this location. The maximum limit for background concentrations was matched for one sampling period only at Site 35 (September) and in October at Sites 8, 15 and 28.

Moss exposed at Site 28 exceeded the normal background in September and in October but there was no obvious source of airborne cadmium at this site (Table 24). Calcium, iron and magnesium tended to be somewhat elevated (in comparison to other sites) at Sites 8, 12, 13 and 22 on one or two occasions (Tables 25, 30, 32). The first three of these are located in close proximity to the EFW and hospital. Construction activity could account for elevated levels of these elements which are constituents of soil.

Nickel values at Site 35 in September were above background but no source of this element was found (Table 35). Sodium values at Site 22 were elevated in August (Table 37). The sulphur content of moss in October (Table 38) at Sites 8 and 15 were somewhat higher than at other locations (.35% and .26% respectively). Zinc values (Table 40) at Sites 21 and 34 were consistently higher than at the other sites but no obvious source of this metal was observed.

In summary, a network of 41 moss bag monitors was operated in the vicinity of the Victoria Hospital EFW plant for 3 one-month periods during the summer and fall of 1984 to determine background air quality conditions. The results of this survey generally indicated normal urban conditions however, isolated areas were identified where elevated concentrations of arsenic, cadmium, nickel, sodium, sulphur and zinc were present on one or two occasions. No source for any of these higher concentrations was identified. Construction activity is believed to be responsible for higher levels of calcium, iron and magnesium, found at several sites in close proximity to the Victoria Hospital.

3.6 PERMANENT PLOT

On August 23, 1984, based on available information and reconnaissance, a 20 x 20 m permanent plot was established in Zone 5, north of Spettigue's Pond in the Maple-Beech-Elm Forest (Figure 3). The area selected represented one of the locations in the Conservation Area having the highest elevation and least disturbance. This mature stand is almost directly downwind of the proposed EFW Plant and is thus useful for observing long term effects of the EFW stack emissions on a forest community, (particularly plant communities), and plant diversity.

The permanent plot was selected to monitor possible plant community change and growth effects resulting from future EFW power plant emissions. The plot *is intended to be representative of the area from which it was selected and it is not meant to be representative of the forested zones as a whole since many past influences (cutting, cattle, etc.) and the high heterogeneic nature of the Conservation Area make this impossible.*

Within the plot, the species of all trees having diameters at breast height (dbh) of 5 cm or greater were recorded, measured (both dbh and height) and tagged with a number for future identification.

Two randomly selected line transects were run in a North-South direction. The line-intercept method was then used in determining cover by a consideration of the total cover of each species along a line in comparison with the total length of the line. This also provided a presence list for the ground cover including tree seedlings, saplings, shrubs and herbs. Tree species cover were also determined using this method. Increment cores were taken at dbh from the largest tree of each species to assess growth patterns within the trees. As well, the general health status of each tree based on a list of criteria (Appendix) was assessed.

Trees

Sugar maple and white ash were condominant species in the plot with 600 and 475 stems/ha and 7.5 and 18.6 m^2/ha basal area respectively. Sugar maple trees were more abundant, while the white ash were present as larger trees (Table 41).

All trees in the plot were rated as to their general health status on an index scale where 9 = excellent and 32 = poor. From Table 41, it is evident that white ash, suffering from the white ash decline disease was in the poorest condition with a rating of 19.7. Six of the nine dead trees in the plot were white ash.

Tree species, number, basal area and condition are presented in Table 41. Tree ages of 2 sugar maple, an American birch, shagbark hickory and white ash are also presented in the Table. A plot of annual ring growth vs year of growth is presented in Figure 6.

Aging of the stand using increment cores indicated that the average age of the older trees in the plot was 66 years. This showed that cutting had occurred in *the past since no large fallen trees were present. Figure 7 shows the pattern of growth of sugar maple, American beech, shagbark hickory and white ash in the study area based on annual tree ring growth. Two species, shagbark hickory and white ash showed a decline in growth (since 1960) for the hickory and 1978 for the white ash). This would be expected for the white ash based on the ratings (Table 4) for the individual trees.*

Canopy cover which was determined by the line intercept method is given in Table 42. Total tree cover was 100% indicative of overlap and an almost full canopy. Sugar maple made up 63.5% of the tree canopy with 16.5% occupied by white ash and 26.5% by iron wood. The understory canopy was evenly divided between three species: sugar maple, American beech and ironwood.

Saplings, Shrubs and herbs and Tree Seedlings

Percent cover of saplings, shrubs, tree seedlings and herbs are presented in Table 42 which also shows species presence. Three sapling and shrub species were sampled: sugar maple, American beech and pin cherry with a total of 41.7% cover. Tree and shrub seedlings, defined as <1 m high included seven species with a total cover of 24%. Herbs comprised 21.1% of the ground cover with 6 species being sampled including the rare orchid Epipactus helliborine (Helliborine). A paucity of ground cover was apparent at the time of sampling. Other species in the area but not recorded by the line intercept method included poison ivy, Trillium, May apple, witch hazel, Nemopanthus, lady fern and hawthorn.

3.7 SOIL PIT

On August 28, 1984, a visit to the permanent plot location was made to determine the current chemical and physical status of the soil. After a brief reconnaissance survey, a soil pit location was chosen that was representative of the study plot site. A 0.5 x 1.0 m pit was then dug to a depth of 70 cm on a crest in the maple-beech ash forest. Samples were collected from each of the identifiable soil horizons and processed for chemical and physical properties by standard methods.

The soil pit was situated immediately adjacent to and within 6 m of the permanent observation plot. Observations indicated that the site had been heavily utilized in the past by grazing animals and humans resulting in 'severe *compaction of the surface soil, erosion of organic matter and exposure of major tree roots'. These observations were also noticed in other forested areas, especially on slopes.*

The soil profile, which had a loamy texture at the surface changed rapidly to clay with depth, showing weak horizon development and a lack of an undecomposed litter layer. Strong, angular, blocky structure throughout the profile has developed due to the abundance of clay. Medium and fine tree roots within the profile extended from 0-40 cm and, below 40 cm, only large roots were evident.

Table 43 lists the analytical results of the soil samples obtained from the soil pit. Soil pH ranged from neutral at the surface, with a very strongly acid subsurface horizon to moderately alkaline at depth. These abrupt pH changes are unusual and likely indicate some past disturbance. The coarser texture at the surface of the profile may have resulted from the removal of the finer colloidal material (i.e. clay) by surface erosion. Organic carbon in the A horizon is relatively low and has probably resulted from the over-utilization of the site and the reduced amount of organic matter present. Carbonates are abundant at a depth of 20 cm. The cation exchange capacity indicates a moderate to high availability of base cations such as Ca, Mg and K. Exchangeable aluminum is present in the acidic Bt horizon, however, soluble aluminum is not expected to be a problem due to the high carbonate content of the Bmk and Ck horizons.

Based on these preliminary results, the soil profile may be classified as luvisolic due to the accumulation of clay in the Bt horizon. Although an Ae horizon was not evident in the field, it may have existed in association with the sampled Ah horizon. Its presence may have been masked due to the degradation of the Ah horizon.

Luvisolic soils generally have a high nutrient status due to an abundance of cation exchange sites, and may be buffered against changes in pH due to the presence of carbonates at depth. Vertical water movement may be impeded due to textural stratification within the profile. Water will infiltrate slowly but after infiltration, the water is retained by the soil. Once dried, this soil becomes very hard, compact and unsuitable for root growth. During times of heavy precipitation or in low lying depressional areas, the soil profile would become imperfectly drained and show evidence of mottling due to the *reduction of iron. Construction on these soils may be difficult due to their high water holding capacity, increased freeze/thaw activity, stickiness when wet, and their hard, compact condition when dry.*

4.0 SUMMARY

A pre-operational study was designed and implemented in the vicinity of the EFW power plant which is to go on line in 1987. The program included a moss bag program, a visual assessment of vegetation, reconnaissance of the bog area for rare and uncommon species, a soil and foliage collection, and the establishment of a permanent plot in the forested area. After start-up of the plant, the program can be repeated annually with the various studies being repeated periodically. It will also be necessary to monitor and incorporate influences resulting from human activity, subdivision development, ash and maple dieback and landfill gases on the plant community which could have a significant impact on the area beyond any possible influence of the EFW power plant. Should PCB's or dioxin appear in the ambient monitoring program, sampling of vegetation and soils will then be conducted.

5.0 REFERENCES

Temple, P.J., D.L. McLaughlin, S.N. Linzon and R. Wills, 1981. Moss bags as monitors of atmospheric deposition. APCA Journal 31:668-670.

McLeod, D. 1981. Biological survey of the proposed Westminister Pond/Pond Mills Conservation Area. A report for the Upper Thames River Conservation Authority and the City of London.

ARB-68-83-Phyto. 1983 Field Investigation Manual, Phytotoxicology Section - Air Resources Branch.

6.0 ACKNOWLEDGEMENTS

Appreciation is expressed to D. McLeod who provided invaluable assistance through a site visit and the identification of some plant specimens collected from the permanent plot location. The author wishes to thank Dr. K. Palmer who designed the study and supervised the sampling activity.

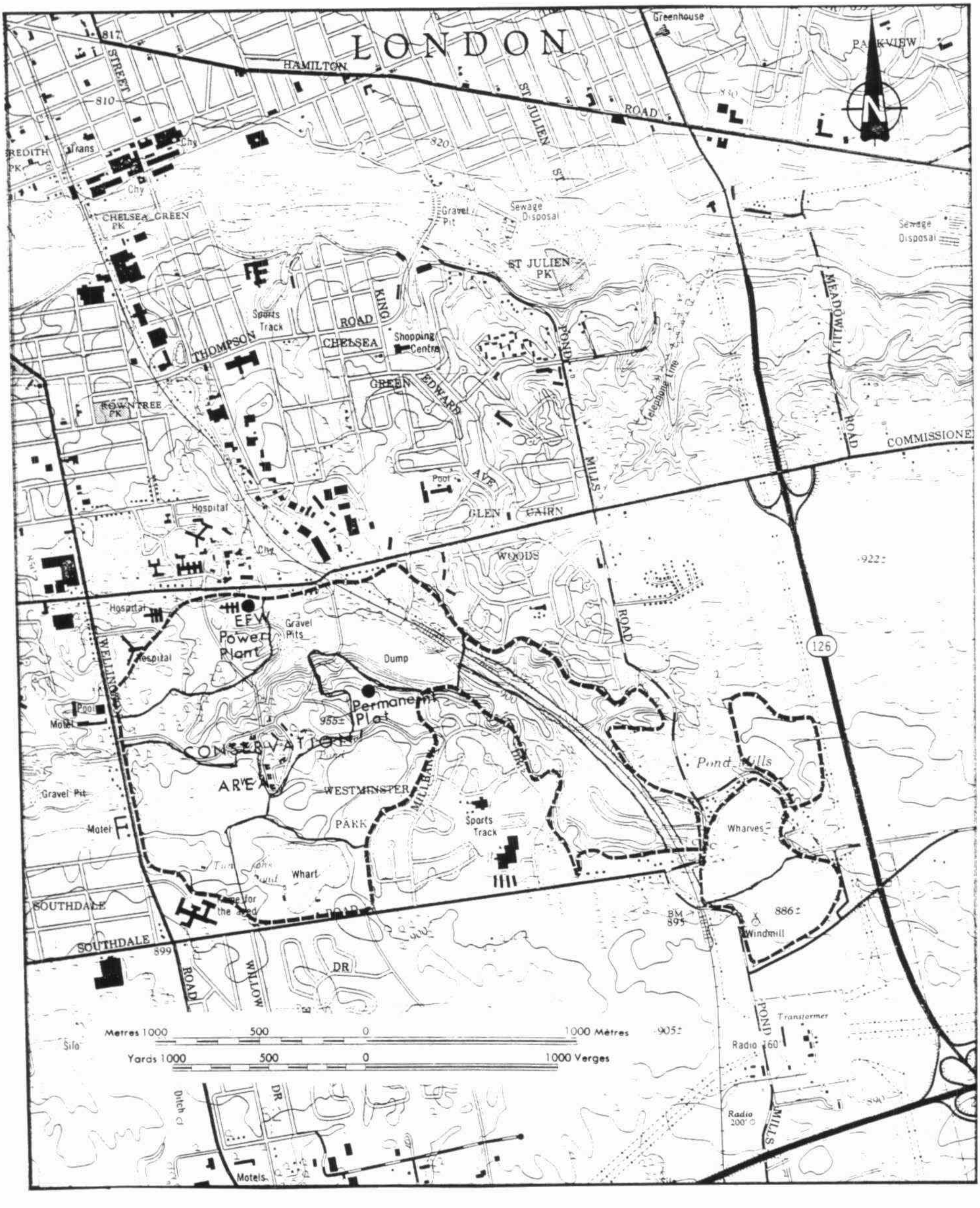

FIGURE 1: Westminster Ponds/Pond Mills Conservation Area, London, Ontario, and location of EFW Power Plant, Victoria Hospital and permanent plot

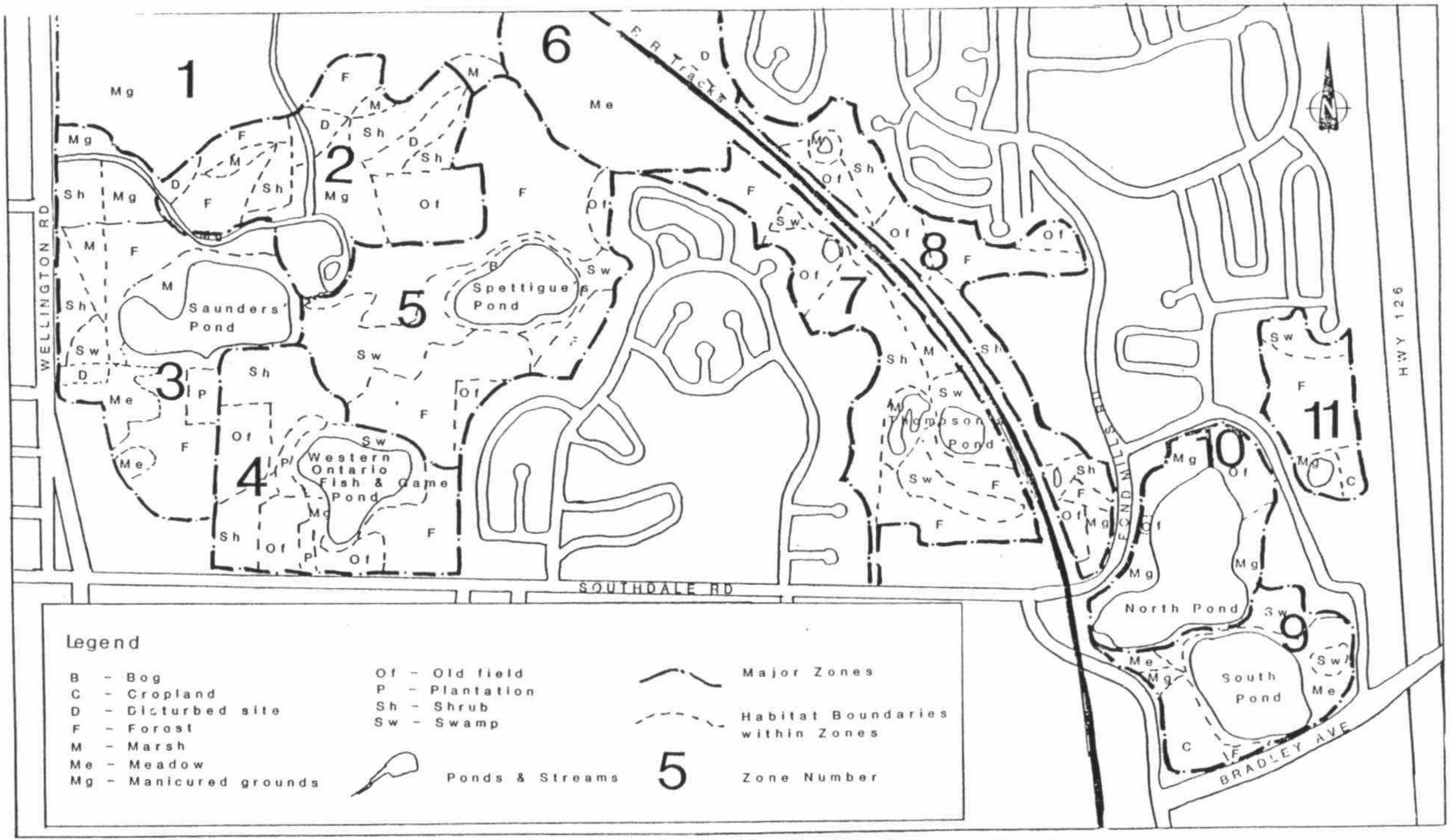

Figure 2 Biological zones of the Westminster Ponds /Pond Mills Conservation Area

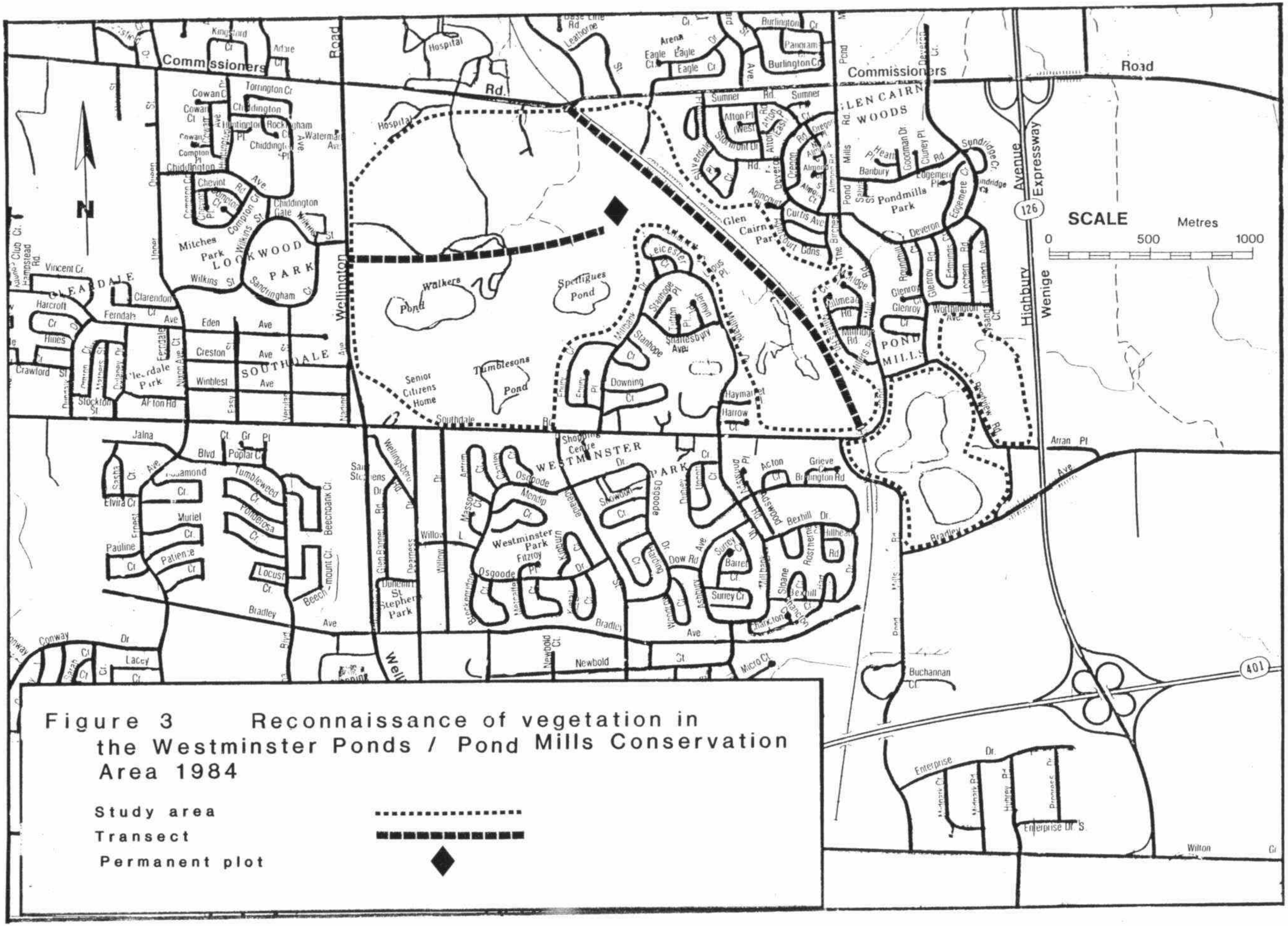

Figure 3 Reconnaissance of vegetation in the Westminster Ponds / Pond Mills Conservation Area 1984

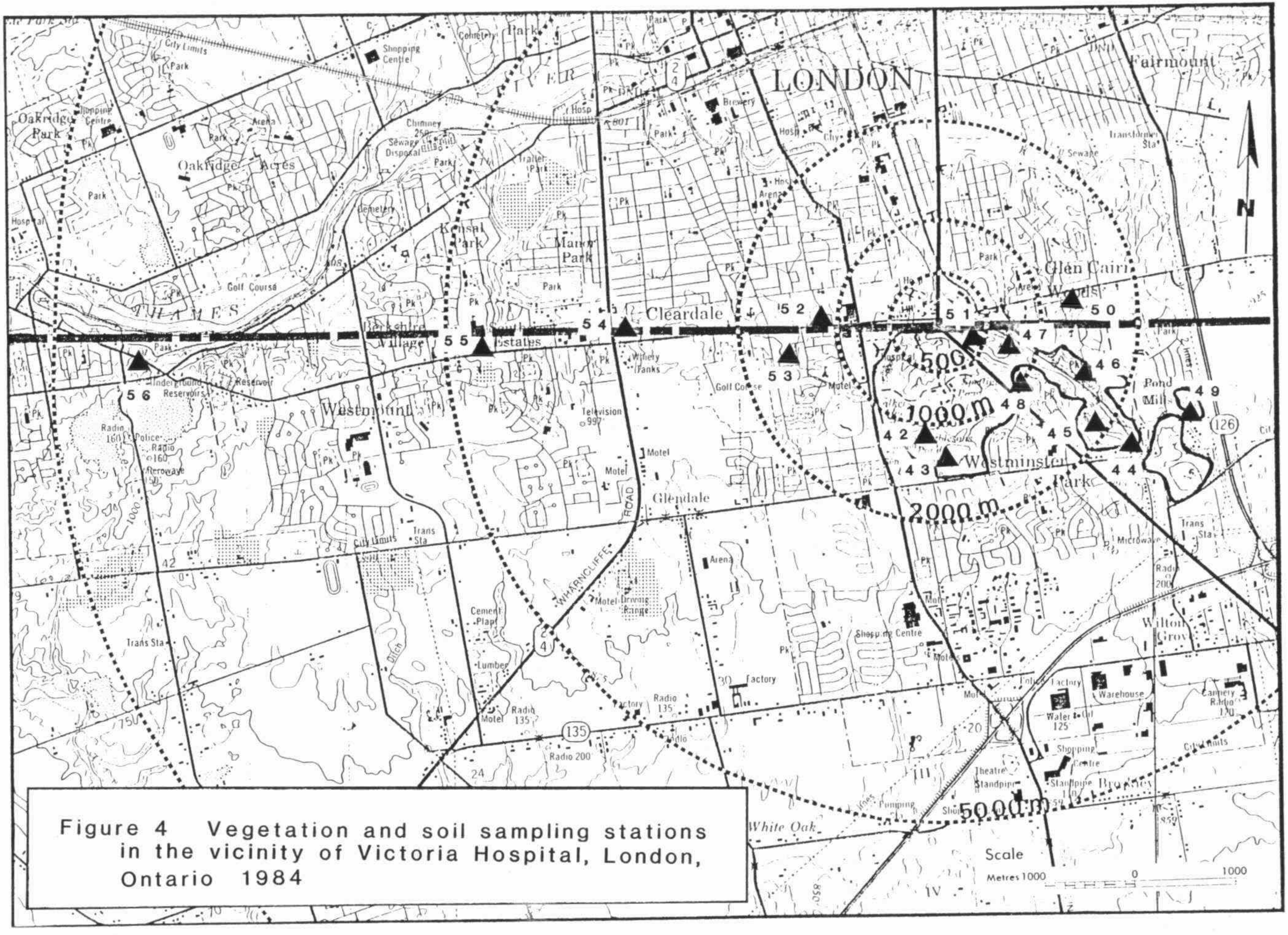

Figure 4 Vegetation and soil sampling stations in the vicinity of Victoria Hospital, London, Ontario 1984

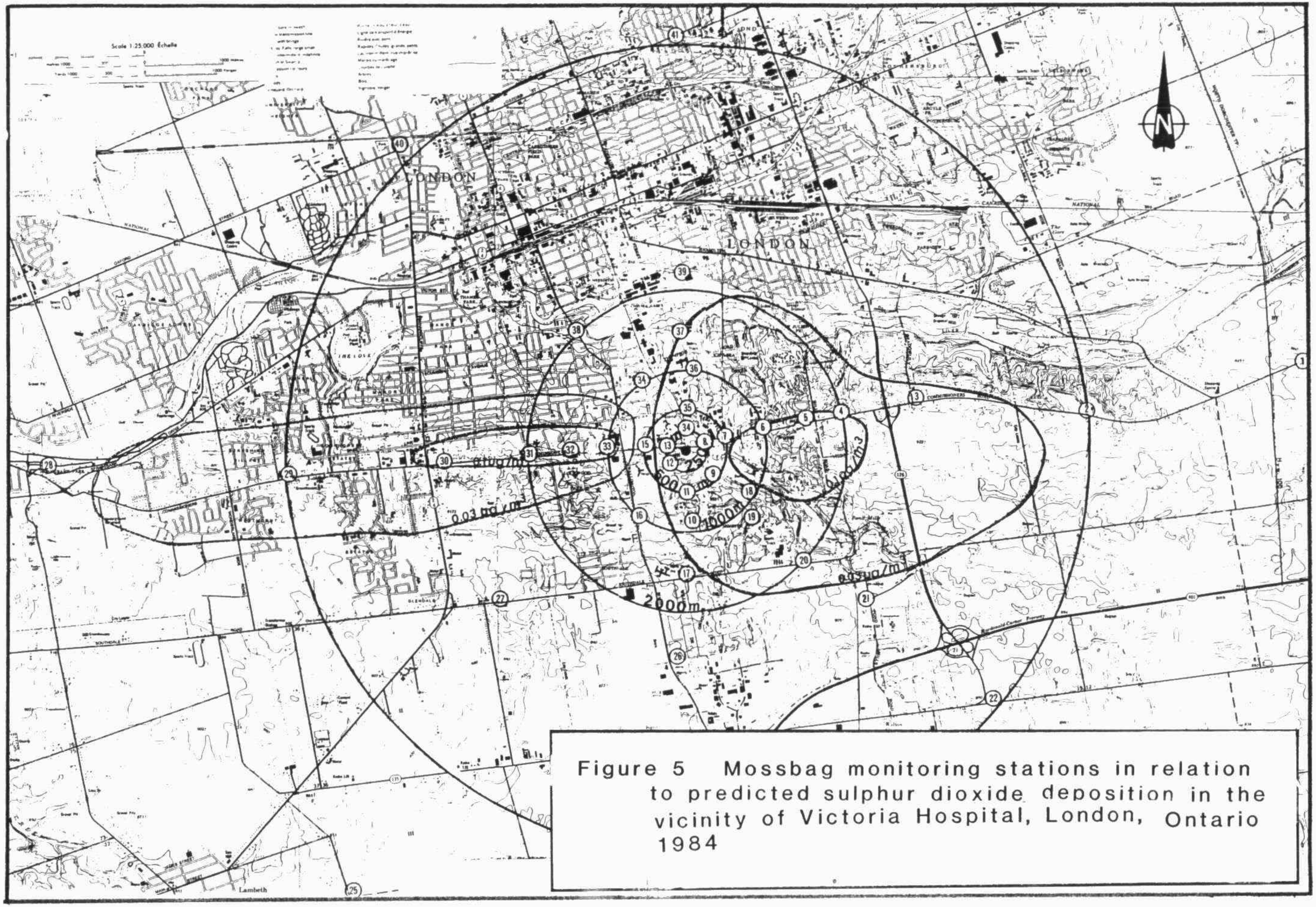

Figure 5 Mossbag monitoring stations in relation to predicted sulphur dioxide deposition in the vicinity of Victoria Hospital, London, Ontario 1984

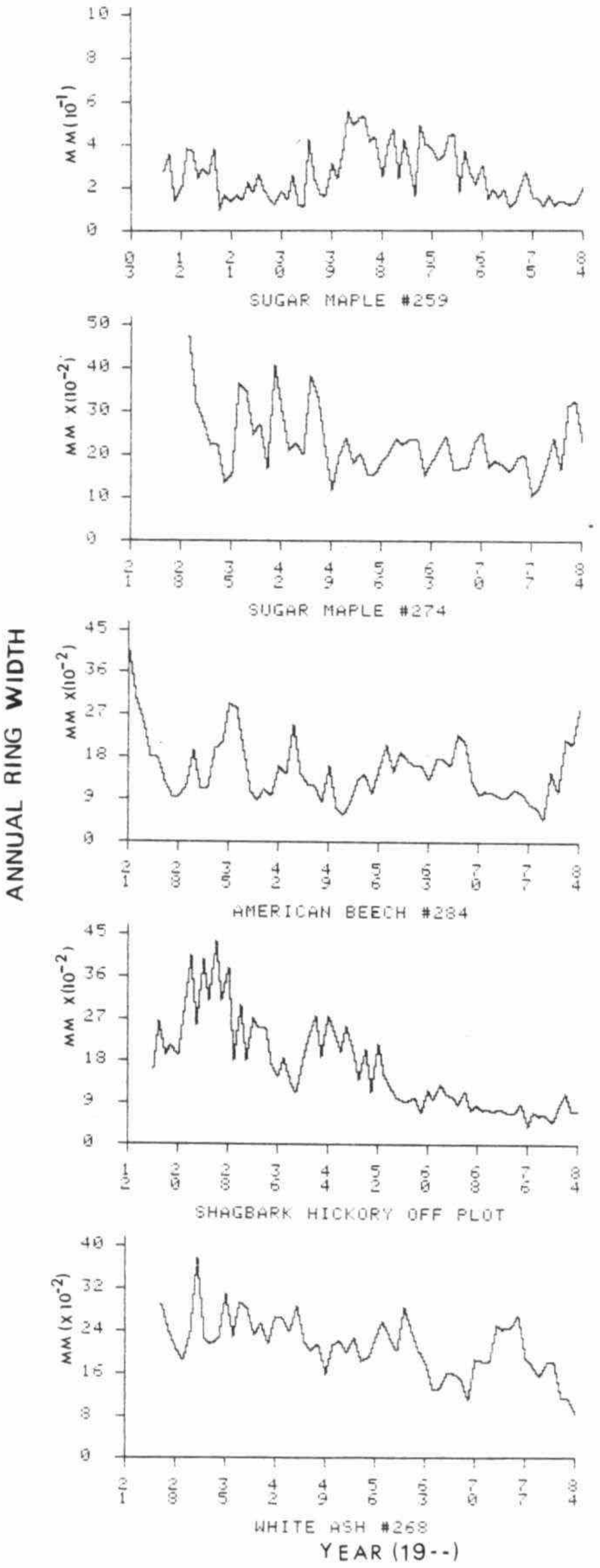

Figure 6 Annual growth pattern of four tree species in permanent plot

TABLE 1

TOLERANCE OF SOME PLANT SPECIES TO LANDFILL GASES

(based on literature)

	Sensitivy Range		
Species	**Tolerant**	**Intermediate**	**Sensitive**
Trees:			
American linden (Tilia americana)			
Norway maple (Acer platenoides)			
sugar maple (Acer saccharum)			
red maple (Acer rubrum)			
Manitoba maple (Acer negundo)			
rough-fruited maple (Acer spp.)			
honey locust (Gleditsia triacanthos)			
black gum (Nyssa sylvatica)			
sweet gum (Liquidambar styraciflua)			
Norway spruce (Picea abies)			
white spruce (Picea glauca)			
spruce (Picea mariana)			
cherry (fruit) (Prunus avium)			
apple (fruit) (Malus pumila)			
pear (fruit) (Pyrus communis)			
lombardy poplar (Populus nigra)			
silver poplar (Populus alba)			
hybrid poplar (Populus spp.)			
white birch (Betula papyrifera)			
ginkgo (Ginkgo biloba)			
white pine (Pinus strobus)			
red pine (Pinus resinosa)			
sycamore (Plantanus occidentalis)			
pin oak (Quercus palustris)			
black oak (Quercus velutina)			
red oak (Quercus borealis)			
American elm (Ulmus americana)			
slippery elm (Ulmus fulva)			

TABLE 1 (Continued)

Japanese yew (Taxus cuspidata capitata)
mountain ash (Sorbus americana)
green ash (Fraxinus pennyslvanica var. lanceolata)
weeping willow (Salix babylonica)
Douglas fir (Pseudotsuga menziesii)
shagbark hickory (Carya ovata)
horse chestnut (Aesculus hippocastanum)
black walnut (Juglans nigra)
Tree-of-Heaven (Ailanthus altissima)
catalpa (Catalpa bignonioides)

Other Plants:
bayberry (Myrica pensylvanica)
dracena (Dracena spp.)
alder (Alnus spp.)
silver bell (Halisia caroliniana)
rhododendron (Rhododendron spp.)
euonymus (Euonymus spp.)
privet (Ligustrum spp.)
ferns (Polypodiaceae spp.)
liverworts (Hepatica spp.)
Bermuda grass (Cyndon dactylon)
fuchsia (Fuchsia spp.)
salvia (Salvia splendens)
mosses (general)

TABLE 2

DISEASES, INSECT PEST AND INJURIES OBSERVED ON TREES AND SHRUBS IN THE WESTMINSTER PONDS/POND MILLS CONSERVATION AREA, LONDON, AUGUST 1984

Location	Host	Agent/Condition	Remarks
A to B Line	Grape	Powdery Mildew, Microsphaera alni	slight
	Ash	i Canker, Hypoxylon fruit bodies	slight
		ii Dieback	moderate
		iii Anthracnose, Gloeosporium aridum	slight
	Elm	Cockscomb gall, Colopha ulmicola	slight
	Oak	Insect skeletonizing	moderate
	Hickory	Nectria, fruit bodies	slight
	Ironwood	Insect skeletonizing	slight
	Cherry	Black knot, Dibotryon morbosum	severe
	Maple	Leaf spot, Phyllosticta minima	moderate
		Leaf spot gall, Cecidomyia ocellaris	moderate
	Dogwood	Leaf spots, Spetoria cornicola & Cercospora cornicola	severe
	Hawthorn	Rust, Gymnosporangium globosum	severe
Oldfield Chain link fence)	Dogwood	Leaf spot, S. cornicola & C. cornicola	severe
	Ash	i Dieback symptoms	moderate - severe
		ii Leaf spot, Piggotia fraxini	
		iii Antracnose, G. aridum	moderate

TABLE 2 (Continued)

Location	**Host**	**Agent/Condition**	**Remarks**
	Grape	Phylloxera gall, Phylloxera vitifoliae	moderate
	Alfalfa	Bleached leaf tip (Physiogenic)	slight
	Maple	Leaf spot, P. minima gall leaf spot, C. ocellaris	moderate
	Beech	Scale, Cryptococcus fagi	slight
	Hawthorn	Rust, Gymnosporangium globosum	severe
	Apple	i Scab, Venturia inaequalis	slight
		ii fruit maggot	
	Walnut	Eastern tent caterpillar, Malacosoma americanum	slight - moderate
	Pear	Blister mite, Eriophyes pyri	moderate
Permanent Observation Plot	Maple	i Leave spot, P. minima	slight
		ii Gall leaf spot, C. ocellaris	slight
		iii Spindle gall, Vasates aceris	
		iv Bladder Gall, V. quadripedes	slight
	Cherry	Black knot, Dibotryon morbosum	moderate - severe
	Ash	i Bieback	
		ii Anthracnose, G. aridum	slight - moderate
	Hawthorn	Rust, G. globosum	severe
	Dogwood	Leaf spots, C. cornicola & S. cornicola	moderate - severe
	Beech	Scale, Cryptococus fagi	slight

TABLE 2 (Continued)

Location	**Host**	**Agent/Condition**	**Remarks**
Esker Site	*Dogwood*	*Leaf spots, C. cornicola & C. cornicola*	*moderate - severe*
	Cherry	*Black knot, D. morbosum*	*moderate - severe*
	Walnut	*i Eastern tent caterpillar, Malacosoma americanum*	*slight*
		ii Leaf gall, Eriophyid sp.	*slight*
	Willow	*Leaf bettle, Salix caprea*	*moderate*
	Locust	*Digitate mine, Parectopa robiniella*	*moderate*
	Hawthorn	*Rust, G. globosum*	*moderate - severe*
	Beech	*Scale, G. fagi*	*slight*
	Ash	*i Dieback*	*slight - moderate*
		ii Anthracnose, G. aridum	*slight*
Pond Mills Road adjacent to #555	*Horse chestnut*	*Leaf scorch, Guignardia aesculi*	*moderate*
	Eastern white pine	*Blister rust, Cronartium ribicola*	*slight - moderate*
	Cherry	*Forest tent caterpillar M. americanum*	*slight*

TABLE 3

CONCENTRATION OF ANTIMONY (μg/g) IN FOLIAGE AND SOIL (0-5 cm) SAMPLES COLLECTED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Silver Maple		Sugar Maple		
Site	Location	Washed	Not Washed	Washed	Not Washed	Soil
42	1300 m S	<.03	.03			.22
43	1600 m S	<.03	<.03			.35
44	2200 m SE			<.03	<.03	.28
45	2000 m SE			<.03	<.03	.20
46	1500 m SE			<.03	<.03	.28
47	700 m E			<.03	<.03	.47
48	1000 m SE			<.03	<.03	.47
49	2500 m SE			<.03	<.03	.35
50	1500 m E		<.03			.33
51	350 m E		<.03			.33
52	1100 m W		<.03			1.38
53	1500 m W		<.03			.33
54	3200 m W		<.03			.07
55	4500 m W		<.03			.14
56	8100 m W		<.03			.14

TABLE 4

CONCENTRATION OF ARSENIC (µg/g) IN FOLIAGE AND SOIL (0-5 cm) SAMPLES COLLECTED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Silver Maple		Sugar Maple		
Site	**Location**	**Washed**	**Not Washed**	**Washed**	**Not Washed**	**Soil**
42	1300 m S	<.03	<.03			3.81
43	1600 m S	.61	1.35			5.18
44	2200 m SE			.61	.61	2.71
45	2000 m SE			.61	.61	2.56
46	1500 m SE			.61	.61	3.73
47	700 m E			.61	.61	4.53
48	1000 m SE			.61	.61	4.13
49	2500 m SE			<.03	<.03	3.41
50	1500 m E		<.03			5.53
51	350 m E		<.03			3.80
52	1100 m W		<.03			4.17
53	1500 m W		<.03			4.02
54	3200 m W		<.03			3.65
55	4500 m W		<.03			2.85
56	8100 m W		<.03			4.24

TABLE 5

CONCENTRATION OF CADMIUM (µg/g) IN FOLIAGE AND SOIL (0-5 cm) SAMPLES COLLECTED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Silver Maple		Sugar Maple		
Site	**Location**	**Washed**	**Not Washed**	**Washed**	**Not Washed**	**Soil**
42	1300 m S	< .1	< .1			.9
43	1600 m S	< .1	< .1			1.9
44	2200 m SE			.2	.2	.7
45	2000 m SE			< .1	.1	.3
46	1500 m SE			.2	.2	.6
47	700 m E			< .1	.1	.8
48	1000 m SE			< .1	.1	.8
49	2500 m SE			< .1	< .1	.6
50	1500 m E		< .1			.6
51	350 m E		.1			.5
52	1100 m W		.1			.5
53	1500 m W		.2			.5
54	3200 m W		.1			.6
55	4500 m W		.1			.5
56	8100 m W		< .1			.4

TABLE 6

CONCENTRATION OF CALCIUM (µg/g) IN FOLIAGE AND SOIL (0-5 cm) SAMPLES COLLECTED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Silver Maple		Sugar Maple		
Site	**Location**	**Washed**	**Not Washed**	**Washed**	**Not Washed**	**Soil**
42	1300 m S	6,500	8,000			58,000
43	1600 m S	7,300	10,000			2,000
44	2200 m SE			22,000	22,000	3,900
45	2000 m SE			23,000	15,000	3,400
46	1500 m SE			15,000	15,000	1,300
47	700 m E			15,000	12,000	5,900
48	1000 m SE			14,000	14,000	5,000
49	2500 m SE			18,000	16,000	6,800
50	1500 m E					30,000
51	350 m E					54,000
52	1100 m W					24,000
53	1500 m W					43,000
54	3200 m W					9,900
55	4500 m W					36,000
56	8100 m W					25,000

TABLE 7

CONCENTRATION OF CHLORIDE (%) IN FOLIAGE AND SOIL (0-5 cm) SAMPLES COLLECTED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Silver Maple		Sugar Maple		
Site	Location	Washed	Not Washed	Washed	Not Washed	Soil
42	1300 m S	.04	.04			<.01
43	1600 m S	.09	.13			<.01
44	2200 m SE			.05	.04	<.01
45	2000 m SE			.02	.03	.02
46	1500 m SE			.04	.05	<.01
47	700 m E			.05	.05	<.01
48	1000 m SE			.02	.02	<.01
49	2500 m SE			.02	.02	<.01
50	1500 m E		.30			.02
51	350 m E		.18			.02
52	1100 m W		.11			.02
53	1500 m W		.20			.02
54	3200 m W		.61			.04
55	4500 m W		.28			.04
56	8100 m W		.28			<.01

TABLE 8

CONCENTRATION OF CHROMIUM (µg/g) IN FOLIAGE AND SOIL (0-5 cm) SAMPLES COLLECTED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Silver Maple		Sugar Maple		
Site	Location	Washed	Not Washed	Washed	Not Washed	Soil
42	1300 m S	<1	<1			24
43	1600 m S	<1	<1			25
44	2200 m SE			<1	<1	15
45	2000 m SE			<1	<1	12
46	1500 m SE			<1	<1	14
47	700 m E			<1	<1	16
48	1000 m SE			<1	<1	17
49	2500 m SE			<1	<1	13
50	1500 m E		1			27
51	350 m E		2			23
52	1100 m W		2			22
53	1500 m W		<1			22
54	3200 m W		1			17
55	4500 m W		1			18
56	8100 m W		1			17

TABLE 9

CONCENTRATION OF COPPER (µg/g) IN FOLIAGE AND SOIL (0–5 cm) SAMPLES COLLECTED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Silver Maple		Sugar Maple		
Site	**Location**	**Washed**	**Not Washed**	**Washed**	**Not Washed**	**Soil**
42	1300 m S	8	8			18
43	1600 m S	10	10			36
44	2200 m SE			4	4	7
45	2000 m SE			6	7	6
46	1500 m SE			5	5	9
47	700 m E			4	4	13
48	1000 m SE			4	4	11
49	2500 m SE			4	4	8
50	1500 m E		6			26
51	350 m E		14			19
52	1100 m W		6			13
53	1500 m W		8			23
54	3200 m W		25			14
55	4500 m W		9			19
56	8100 m W		5			11

TABLE 10

CONCENTRATION OF FLUORIDE (µg/g) IN FOLIAGE AND SOIL (0-5 cm) SAMPLES COLLECTED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

Site	Location	Silver Maple Washed	Silver Maple Not Washed	Sugar Maple Washed	Sugar Maple Not Washed	Soil
42	1300 m S	2	3			67
43	1600 m S	3	4			54
44	2200 m SE			2	3	21
45	2000 m SE			2	2	13
46	1500 m SE			2	2	24
47	700 m E			2	2	28
48	1000 m SE			2	2	35
49	2500 m SE			2	2	24
50	1500 m E		10			40
51	350 m E		10			55
52	1100 m W		8			30
53	1500 m W		5			53
54	3200 m W		6			40
55	4500 m W		6			42
56	8100 m W		5			41

TABLE 11

CONCENTRATION OF IRON (µg/g) IN FOLIAGE AND SOIL (0-5 cm) SAMPLES COLLECTED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Silver Maple		Sugar Maple		
Site	Location	Washed	Not Washed	Washed	Not Washed	Soil
42	1300 m S	107	130			20,000
43	1600 m S	92	120			22,000
44	2200 m SE			58	84	15,000
45	2000 m SE			67	93	14,000
46	1500 m SE			61	85	14,000
47	700 m E			50	89	16,000
48	1000 m SE			87	120	18,000
49	2500 m SE			110	160	14,000
50	1500 m E		270			25,000
51	350 m E		750			15,000
52	1100 m W		300			14,000
53	1500 m W		200			17,000
54	3200 m W		230			19,000
55	4500 m W		170			14,000
56	8100 m W		140			16,000

TABLE 12

CONCENTRATION OF LEAD (µg/g) IN FOLIAGE AND SOIL (0-5 cm) SAMPLES COLLECTED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Silver Maple		*Sugar Maple*		
Site	*Location*	*Washed*	*Not Washed*	*Washed*	*Not Washed*	*Soil*
42	1300 m S	<1	2			16
43	1600 m S	1	4			69
44	2200 m SE			1	2	19
45	2000 m SE			1	3	25
46	1500 m SE			1	2	21
47	700 m E			1	2	25
48	1000 m SE			2	4	21
49	2500 m SE			2	4	24
50	1500 m E		35			92
51	350 m E		28			52
52	1100 m W		29			210
53	1500 m W		16			84
54	3200 m W		18			36
55	4500 m W		16			120
56	8100 m W		12			30

TABLE 13

CONCENTRATION OF MAGNESIUM (µg/g) IN FOLIAGE AND SOIL (0-5 cm) SAMPLES COLLECTED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Silver Maple		Sugar Maple		
Site	Location	Washed	Not Washed	Washed	Not Washed	Soil
42	1300 m S	1,700	1,700			11,000
43	1600 m S	1,600	1,600			8,500
44	2200 m SE			2,000	2,000	2,900
45	2000 m SE			1,900	2,100	1,800
46	1500 m SE			1,500	1,400	2,800
47	700 m E			1,500	1,400	3,700
48	1000 m SE			1,600	1,600	4,000
49	2500 m SE			1,900	1,800	3,800
50	1500 m E					10,000
51	350 m E					15,000
52	1100 m W					6,500
53	1500 m W					11,000
54	3200 m W					4,400
55	4500 m W					9,100
56	8100 m W					7,300

TABLE 14

CONCENTRATION OF MANGANESE (μg/g) IN FOLIAGE AND SOIL (0-5 cm) SAMPLES COLLECTED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Silver Maple		Sugar Maple		
Site	Location	Washed	Not Washed	Washed	Not Washed	Soil
42	1300 m S	41.	49			390
43	1600 m S	37	37			390
44	2200 m SE			150	160	190
45	2000 m SE			83	92	110
46	1500 m SE			250	250	290
47	700 m E			45	67	390
48	1000 m SE			60	54	280
49	2500 m SE			135	140	210
50	1500 m E		43			560
51	350 m E		51			380
52	1100 m W		68			430
53	1500 m W		160			360
54	3200 m W		15			490
55	4500 m W		98			400
56	8100 m W		71			450

TABLE 15

CONCENTRATION OF MOLYBDENUM (µg/g) IN FOLIAGE AND SOIL (0-5 cm) SAMPLES COLLECTED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

Site	Location	Silver Maple		Sugar Maple		Soil
		Washed	Not Washed	Washed	Not Washed	
42	1300 m S	<.5	<.5			1.0
43	1600 m S	<.5	<.5			1.7
44	2200 m SE			<.5	.6	<1.0
45	2000 m SE			<.5	<.5	1.3
46	1500 m SE			<.5	<.5	<1.0
47	700 m E			<.5	<.5	1.4
48	1000 m SE			<.5	<.5	<1.0
49	2500 m SE			1.2	<.5	<1.0
50	1500 m E		.5			1.1
51	350 m E		.6			1.8
52	1100 m W		.5			<1.0
53	1500 m W		<.5			<1.0
54	3200 m W		<.5			<1.0
55	4500 m W		<.5			<1.0
56	8100 m W		<.5			<1.0

TABLE 16

CONCENTRATION OF NICKEL (µg/g) IN FOLIAGE AND SOIL (0-5 cm) SAMPLES COLLECTED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Silver Maple		Sugar Maple		
Site	Location	Washed	Not Washed	Washed	Not Washed	Soil
42	1300 m S	<1	<1			17
43	1600 m S	<1	<1			20
44	2200 m SE			<1	<1	9
45	2000 m SE			<1	<1	7
46	1500 m SE			<1	<1	11
47	700 m E			<1	<1	14
48	1000 m SE			<1	<1	13
49	2500 m SE			<1	<1	9
50	1500 m E		<1			18
51	350 m E		3			13
52	1100 m W		1			12
53	1500 m W		<1			13
54	3200 m W		<1			10
55	4500 m W		<1			9
56	8100 m W		<1			8

TABLE 17

CONCENTRATION OF SELENIUM (µg/g) IN FOLIAGE AND SOIL (0-5 cm) SAMPLES COLLECTED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Silver Maple		Sugar Maple		
Site	Location	Washed	Not Washed	Washed	Not Washed	Soil
42	1300 m S		<.03			4.67
43	1600 m S		<.03			5.93
44	2200 m SE				<.03	<.03
45	2000 m SE				<.03	.53
46	1500 m SE				<.03	1.66
47	700 m E				<.03	2.50
48	1000 m SE				<.03	.32
49	2500 m SE				<.03	.41
50	1500 m E		<.03			2.49
51	350 m E		<.03			.36
52	1100 m W		<.03			.27
53	1500 m W		<.03			.36
54	3200 m W		<.03			.27
55	4500 m W		<.03			.19
56	8100 m W		<.03			.10

TABLE 18

CONCENTRATION OF SODIUM (µg/g) IN FOLIAGE AND SOIL (0-5 cm) SAMPLES COLLECTED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Silver Maple		*Sugar Maple*		
Site	***Location***	***Washed***	***Not Washed***	***Washed***	***Not Washed***	***Soil***
42	1300 m S	53	18			140
43	1600 m S	42	<10			270
44	2200 m SE			38	<10	72
45	2000 m SE			48	<10	46
46	1500 m SE			35	<10	31
47	700 m E			51	<10	63
48	1000 m SE			46	13	88
49	2500 m SE			35	<10	50
50	1500 m E					240
51	350 m E					150
52	1100 m W					130
53	1500 m W					160
54	3200 m W					130
55	4500 m W					150
56	8100 m W					110

TABLE 19

CONCENTRATION OF SULPHUR (%) IN FOLIAGE AND SOIL (0-5 cm) SAMPLES COLLECTED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Silver Maple		*Sugar Maple*		
Site	***Location***	***Washed***	***Not Washed***	***Washed***	***Not Washed***	***Soil***
42	1300 m S	.13	.14			.05
43	1600 m S	.11	.12			.20
44	2200 m SE			.15	.19	.06
45	2000 m SE			.16	.19	.04
46	1500 m SE			.15	.16	.05
47	700 m E			.15	.15	.09
48	1000 m SE			.14	.15	.07
49	2500 m SE			.22	.24	.06
50	1500 m E		.21			.06
51	350 m E		.13			.05
52	1100 m W		.26			.05
53	1500 m W		.12			.07
54	3200 m W		.13			.06
55	4500 m W		.14			.05
56	8100 m W		.10			.04

TABLE 20

CONCENTRATION OF VANADIUM (µg/g) IN FOLIAGE AND SOIL (0-5 cm) SAMPLES COLLECTED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Silver Maple		Sugar Maple		
Site	Location	Washed	Not Washed	Washed	Not Washed	Soil
42	1300 m S	<1	<1			31
43	1600 m S	<1	<1			33
44	2200 m SE			<1	<1	26
45	2000 m SE			<1	<1	27
46	1500 m SE			<1	<1	20
47	700 m E			<1	<1	25
48	1000 m SE			<1	<1	28
49	2500 m SE			<1	<1	23
50	1500 m E		<1			38
51	350 m E		2			26
52	1100 m W		<1			25
53	1500 m W		<1			29
54	3200 m W		<1			32
55	4500 m W		<1			24
56	8100 m W		<1			28

TABLE 21

CONCENTRATION OF ZINC (µg/g) IN FOLIAGE AND SOIL (0-5 cm) SAMPLES COLLECTED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Silver Maple		Sugar Maple		
Site	Location	Washed	Not Washed	Washed	Not Washed	Soil
42	1300 m S	44	42			55
43	1600 m S	24	24			170
44	2200 m SE			14	15	46
45	2000 m SE			11	12	41
46	1500 m SE			10	10	46
47	700 m E			10	12	64
48	1000 m SE			9	10	56
49	2500 m SE			9	9	47
50	1500 m E		47			110
51	350 m E		62			63
52	1100 m W		70			66
53	1500 m W		46			78
54	3200 m W		31			58
55	4500 m W		66			71
56	8100 m W		18			47

TABLE 22

CONCENTRATIONS OF ANTIMONY (µg/g) IN MOSS EXPOSED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Exposure Period		
Site	Location	July 27 August 27	August 27 September 27	September 27 October 26
1	7300 m E	.15	.10	.07
2	5000 m E	.20	.21	< .03
3	2900 m E	.20	.15	.07
4	2000 n E	.20	.27	.07
5	1600 m E	.15	.21	.07
6	1000 m E	.15	.15	-
7	500 m E	.15	.15	.20
8	300 m E	.29	.21	.39
9	500 m SE	.20	- x -	.20
10	1000 m S	.15	- x -	.07
11	500 m S	.15	.10	.07
12	250 m SW	.20	.49	.14
13	250 m W	.25	.10	.07
14	250 m N	.25	.21	.07
15	500 m W	.20	-	.14
16	1000 m SW	.15	.27	.14
17	1600 m SE	.15	.10	< .03
18	1000 m SE	.15	.10	< .03
19	1200 m SE	.10	.04	< .03
20	2000 m SE	.18	.15	.07
21	3000 m SE	.29	.15	.07
22	5000 m SE	.20	.10	.07
23	8000 m SE	.20	.27	.07
24	5000 m S	.29	.27	.14
25	7000 m SW	.15	.10	.07
26	3000 m S	.29	.27	.14
27	4000 m SW	.20	.10	.14
28	7500 m W	.20	.10	.07
29	5000 m W	.-	.10	.07
30	3000 m W	.25	.27	.07
31	2000 m W	.20	.10	.07
32	1500 m W	.20	-	.07
33	1000 m W	.25	.21	.14
34	1000 m NW	.20	.15	.14
35	500 m N	.25	.23	.33
36	1000 m NE	.20	.10	.20
37	1500 m N	.15	.10	-
38	200 m NW	.15	.15	.07
39	2100 m N	-	-	-
40	5000 m NW	.25	.15	.07
41	5000 m N	.20	.10	-
Unexposed moss bag		-	-	< .03

- x - = sample exhausted

TABLE 23

CONCENTRATIONS OF ARSENIC (µg/g) IN MOSS EXPOSED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

Site	Location	Exposure Period		
		July 27 August 27	August 27 September 27	September 27 October 26
1	7300 m E	.59	1.80	1.86
2	5000 m E	.59	1.55	1.86
3	2900 m E	.59	1.55	1.86
4	2000 m E	.99	1.61	1.93
5	1600 m E	.86	1.87	1.93
6	1000 m E	.86	1.68	-
7	500 m E	.66	1.80	1.93
8	300 m E	.99	1.80	2.00
9	500 m SE	.59	- x -	1.93
10	1000 m S	.46	- x -	1.86
11	500 m S	.52	1.40	1.86
12	250 m SW	.66	1.93	1.93
13	250 m W	.92	1.61	1.86
14	250 m N	.59	1.55	1.86
15	500 m W	.66	-	2.00
16	1000 m SW	.46	1.80	1.72
17	1600 m S	.92	1.68	1.79
18	1000 m SE	1.33	1.68	1.86
19	1200 m SE	1.26	1.87	1.86
20	2000 m SE	1.44	1.74	1.79
21	3000 m SE	1.47	1.68	1.79
22	5000 m SE	1.47	1.74	1.79
23	8000 m SE	1.33	1.80	1.72
24	5000 m S	1.40	1.87	1.86
25	7000 m SW	.79	1.74	1.86
26	3000 m SE	1.97	1.87	1.86
27	4000 m SW	1.83	1.61	1.86
28	7500 m W	1.76	1.80	2.00
29	5000 m W	-	1.99	1.86
30	3000 m W	2.05	2.83	1.86
31	2000 m W	1.76	1.74	1.65
32	1500 m W	1.69	-	1.58
33	1000 m W	1.97	1.93	1.72
34	1000 m NW	1.90	1.80	1.72
35	500 m N	1.83	2.00	1.79
36	1000 m NE	1.90	1.80	1.72
37	1500 m N	1.61	1.74	-
38	2000 m NW	1.69	1.93	1.72
39	2100 m N	-	-	-
40	5000 m NW	1.69	1.74	.34
41	5000 m N	1.65	1.80	-
Unexposed moss bag		-	-	.34

- x - = sample exhausted

TABLE 24

CONCENTRATIONS OF CADMIUM (µg/g) IN MOSS EXPOSED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Exposure Period		
Site	Location	July 27 August 27	August 27 September 27	September 27 October 26
1	7300 m E	.3	.5	.3
2	5000 m E	.3	.4	.3
3	2900 m E	.3	.4	.3
4	2000 m E	.3	.5	.3
5	1600 m E	.3	.4	.3
6	1000 m E	.3	.5	-
7	500 m E	.3	.5	.3
8	300 m E	.6	.6	.6
9	500 m SE	.3	.5	.3
10	1000 m S	.3	.4	.3
11	500 m S	.3	.5	.3
12	250 m SW	.3	.4	.3
13	250 m W	.5	.4	.4
14	250 m N	.2	.4	.3
15	500 m W	.2	-	.3
16	1000 m SW	.2	.5	.3
17	1600 m S	.2	.4	.3
18	1000 m SE	.2	.4	.3
19	1200 m SE	.3	.4	.2
20	2000 m SE	.2	.4	.3
21	3000 m SE	.2	.4	.3
22	5000 m SE	.2	.4	.3
22	5000 m SE	.2	.5	.3
23	8000 m SE	.3	.4	.3
24	5000 m S	.3	.5	.3
25	7000 m SW	.2	.4	.3
26	3000 m S	.3	.6	.3
27	4000 m SW	.2	.4	.3
28	7500 m W	1.3	6.7	8.9
29	5000 m W	-	.9	.4
30	3000 m W	.2	.5	.3.
31	2000 m W	.2	.4	.4
32	1500 m W	.3	-	.3
33	1000 m W	.2	.5	.3
34	1000 m NW	.2	.4	.3
35	500 m N	.2	.7	.4
36	1000 m NE	.2	.3	.4
37	1500 m N	.2	.3	-
38	2000 m NW	.2	.3	.3
39	2100 m N	-	-	-
40	5000 m NW	.3	.4	.3
41	5000 m N	1.4	1.7	-
Unexposed moss bag		-	-	.3

TABLE 25

CONCENTRATIONS OF CALCIUM (µg/g) IN MOSS EXPOSED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Exposure Period		
Site	Location	July 27 August 27	August 27 September 27	September 27 October 26
1	7300 m E	4,000	4,100	4,900
2	5000 m E	3,900	4,800	4,800
3	2900 m E	4,000	5,200	5,100
4	2000 m E	4,600	8,000	5,600
5	1600 m E	4,500	8,400	5,900
6	1000 m E	4,500	8,800	-
7	500 m E	5,000	13,000	7,000
8	300 m E	12,000	36,000	30,000
9	500 m SE	4,300	5,700	6,500
10	1000 m S	3,600	5,400	3,700
11	500 m S	4,000	7,700	4,000
12	250 m SW	5,800	31,000	4,700
13	250 m W	14,000	4,900	27,000
14	250 m N	7,200	10,000	18,000
15	500 m W	10,000	-	7,000
16	1000 m SW	5,000	11,000	7,000
17	1600 m S	3,600	4,200	4,100
18	1000 m SE	3,200	3,900	3,300
19	1200 m SE	3,900	3,700	3,500
20	2000 m SE	4,600	4,700	5,500
21	3000 m SE	4,100	4,400	4,600
22	5000 m SE	16,000	23,000	20,000
23	8000 m SE	4,000	4,300	4,000
24	5000 m S	8,100	11,000	8,600
25	7000 m SW	3,400	4,400	3,900
26	3000 m S	7,100	11,000	10,000
27	4000 m SW	3,800	4,400	4,400
28	7500 m W	3,500	4,400	4,400
29	5000 m W	-	5,000	5,800
30	3000 m W	4,100	5,700	4,500
31	2000 m W	3,700	6,700	5,600
32	1500 m W	3,300	13,000	4,800
33	1000 m W	4,000	-	11,000
34	1000 m NW	6,400	10,000	6,800
35	500 m N	6,900	12,000	8,300
36	1000 m NE	3,500	4,500	4,200
37	1500 m N	3,100	4,000	-
38	2000 m NW	4,100	5,800	4,800
39	2100 m N	-	-	-
40	5000 m NW	4,200	4,200	3,900
41	5000 m N	4,300	4,700	-
Unexposed moss bag		-	-	3,100

TABLE 26

CONCENTRATIONS OF CHLORIDE (%) IN MOSS EXPOSED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Exposure Period		
Site	Location	July 27 August 27	August 27 September 27	September 27 October 26
1	7300 m E	.01	< .01	- x -
2	5000 m E	.01	< .01	.03
3	2900 m E	.01	< .01	.03
4	2000 m E	.02	< .01	.04
5	1600 m E	.02	< .01	.04
6	1000 m E	.02	- x -	-
7	500 m E	.02	< .01	.03
8	300 m E	.04	.01	.10
9	500 m SE	.02	< .01	.04
10	1000 m S	< .01	< .01	.03
11	500 m S	.02	< .01	.05
12	250 m SW	.02	.06	- x -
13	250 m N	.04	< .01	- x -
14	250 m N	.03	.01	.02
15	500 m W	.03	-	.06
16	1000 m SW	.02	< .01	- x -
17	1600 m S	.01	< .01	- x -
18	1000 m SE	< .01	< .01	.01
19	1200 m SE	.01	< .01	.02
20	2000 m SE	.02	< .01	.03
21	3000 m SE	.02	- x -	.03
22	5000 m SE	.07	< .01	.05
23	8000 m SE	.02	< .01	.04
24	5000 m S	.04	< .01	.05
25	7000 m SW	.01	< .01	.02
26	3000 m S	.02	< .01	- x -
27	4000 m SW	.01	< .01	.03
28	7500 m W	< .01	< .01	- x -
29	5000 m W	-	< .01	.05
30	3000 m W	.01	< .01	.03
31	2000 m W	< .01	< .01	.03
32	1500 m W	.01	-	- x-
33	1000 m W	.01	< .01	- x-
34	1000 m NW	.02	< .01	.03
35	500 m N	.05	< .01	.05
36	1000 m NE	.01	< .01	.02
37	1500 m N	< .01	< .01	.-
38	2000 m NW	< .01	< .01	.02
39	2100 m N	-	-	-
40	5000 m NW	< .01	< .01	.02
41	5000 m N	< .01	< .01	-
Unexposed moss bag		-	-	< .01

- x - = sample exhausted

TABLE 27

CONCENTRATIONS OF CHROMIUM (µg/g) IN MOSS EXPOSED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Exposure Period		
Site	**Location**	**July 27 August 27**	**August 27 September 27**	**September 27 October 26**
1	7300 m E	2	2	2
2	5000 m E	2	2	2
3	2900 m E	2	1	1
4	2000 m E	2	2	2
5	1600 m E	2	3	2
6	1000 m E	2	3	-
7	500 m E	2	3	2
8	300 m E	4	5	5
9	500 m SE	2	2	2
10	1000 m S	2	2	2
11	500 m S	2	2	2
12	250 m SW	2	4	2
13	250 m W	4	2	4
14	250 m N	2	2	3
15	500 m W	3	-	3
16	1000 m SW	2	4	3
17	1600 m S	2	2	2
18	1000 m SE	2	2	2
19	1200 m SE	2	2	2
20	2000 m SE	2	2	2
21	3000 m SE	2	2	2
22	5000 m SE	3	4	3
23	8000 m Se	2	2	2
24	5000 m S	3	4	3
25	7000 m SW	2	2	2
26	3000 m S	3	4	3
27	4000 m SW	2	2	2
28	7500 m W	2	2	2
29	5000 m W	-	2	2
30	3000 m W	3	4	3
31	2000 m W	2	2	2
32	1500 m W	2	-	2
33	1000 m W	2	3	3
34	1000 m NW	2	2	2
35	500 m N	3	3	4
36	1000 M NE	2	2	2
37	1500 m N	2	1	-
38	2000 m NW	2	2	2
39	2100 m N	-	-	-
40	5000 m NW	2	2	2
41	5000 m N	2	2	-
Unexposed moss bag		-	-	2

TABLE 28

CONCENTRATIONS OF COPPER (µg/g) IN MOSS EXPOSED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Exposure Period		
Site	Location	July 27 August 27	August 27 September 27	September 27 October 26
1	7300 m E	3	5	5
2	5000 m E	4	6	6
3	2900 m E	4	6	6
4	2000 m E	4	8	6
5	1600 m E	4	11	7
6	1000 m E	6	11	-
7	500 m E	5	10	9
8	300 m E	16	26	21
9	500 m SE	3	6	6
10	1000 m S	3	6	4
11	500 m S	3	6	5
12	250 m SW	4	9	6
13	250 m W	5	5	10
14	250 m N	4	6	13
15	500 m W	5	-	11
16	1000 m SW	6	13	10
17	1600 m S	11	17	10
18	1000 m SE	3	5	4
19	1200 m SE	3	6	4
20	2000 m SE	4	7	5
21	3000 m SE	4	6	6
22	5000 m SE	5	9	6
23	8000 m SE	4	11	14
24	5000 m S	17	24	11
25	7000 m SW	3	5	5
26	3000 m S	7	13	8
27	4000 m SW	4	6	6
28	7500 m W	5	12	6
29	5000 m W	-	18	12
30	3000 m W	5	9	6
31	2000 m W	6	11	8
32	1500 m W	31	-	25
33	1000 m W	4	9	8
34	1000 m NW	4	6	5
35	500 m N	6	9	12
36	1000 m NE	9	11	13
37	1500 m N	6	9	-
38	2000 m NW	4	6	5
39	2100 m N	-	-	-
40	5000 m NW	3	5	5
41	5000 m N	25	41	-
Unexposed moss bag		-	-	4

TABLE 29

CONCENTRATIONS OF FLUORIDE (µg/g) IN MOSS EXPOSED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Exposure Period		
Site	Location	July 27 August 27	August 27 September 27	September 27 October 26
1	7300 m E	2	2	4
2	5000 m E	2	2	4
3	2900 m E	2	1	4
4	2000 m E	2	2	6
5	1600 m E	2	2	7
6	1000 m E	2	2	-
7	500 m E	2	3	5
8	300 m E	3	4	10
9	500 m SE	2	2	6
10	1000 m S	2	1	3
11	500 m S	2	1	3
12	250 m SW	2	4	4
13	250 m W	3	1	9
14	250 m N	3	1	4
15	500 m W	4	-	8
16	1000 m SW	3	1	7
17	1600 m S	2	1	4
18	1000 m SE	2	1	3
19	1200 m SE	4	1	3
20	2000 m SE	2	1	4
21	3000 m SE	2	2	5
22	5000 m SE	4	5	8
23	8000 m SE	2	1	4
24	5000 m S	3	3	6
25	7000 m SW	1	1	3
26	3000 m S	3	3	6
27	4000 m SW	2	1	4
28	7500 m W	1	1	2
29	5000 m W	-	2	5
30	3000 m W	2	1	3
31	2000 m W	2	3	5
32	1500 m W	1	-	5
33	1000 m W	2	3	9
34	1000 m NW	2	3	4
35	500 m N	3	4	7
36	1000 m NE	2	2	3
37	1500 m N	2	3	-
38	2000 m NW	1	2	2
39	2100 m N	-	-	-
40	5000 m NW	1	1	2
41	5000 m N	1	2	-
Unexposed moss bag		-	-	2

TABLE 30

CONCENTRATIONS OF IRON (μg/g) IN MOSS EXPOSED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Exposure Period		
Site	Location	July 27 August 27	August 27 September 27	September 27 October 26
1	7300 m E	820	1,100	1,000
2	5000 m E	820	1,100	1,100
3	2900 m E	840	160	1,100
4	2000 m E	960	1,200	1,100
5	1600 m E	930	1,300	1,100
6	1000 m E	1,000	1,300	-
7	500 m E	910	1,500	1,100
8	300 m E	1,400	2,200	2,200
9	500 m SE	840	1,200	1,000
10	1000 m S	810	1,100	840
11	500 m S	800	1,300	940
12	250 m SW	1,000	2,200	1,100
13	250 m N	1,700	1,100	2,100
14	250 m N	940	1,300	1,600
15	500 m W	1,300	-	1,200
16	1000 m SW	970	1,700	1,200
17	1600 m S	860	1,000	930
18	1000 m SE	780	1,000	850
19	1200 m SE	780	980	860
20	2000 m SE	880	1,100	890
21	3000 m SE	910	1,100	1,000
22	5000 m SE	1,100	1,600	1,300
23	8000 m S	1,200	1,100	1,000
24	5000 m S	1,200	1,700	1,200
25	7000 m SW	790	940	880
26	3000 m S	1,200	1,800	1,300
27	4000 m SW	860	1,000	950
28	7500 m W	810	1,100	880
29	5000 m W	-	1,200	1,000
30	3000 m W	880	1,200	1,000
31	2000 m W	880	1,200	1,100
32	1500 m W	840	-	920
33	1000 m W	890	1,500	1,200
34	1000 m NW	940	1,300	1,000
35	500 m N	1,100	1,400	1,300
36	1000 m NE	870	1,000	1,000
37	1500 m NE	800	1,000	-
38	2000 m NW	900	1,100	990
39	2100 m N	-	-	-
40	5000 m NW	920	930	990
41	5000 m N	900	1,100	-
Unexposed Moss Bag		-	-	940

TABLE 31

CONCENTRATIONS OF LEAD (µg/g) IN MOSS EXPOSED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Exposure Period		
Site	Location	July 27 August 27	August 27 September 27	September 27 October 26
1	7300 m E	28	36	33
2	5000 m E	32	50	36
3	2900 m E	33	43	40
4	2000 m E	44	91	59
5	1600 m E	43	96	82
6	1000 m E	57	100	-
7	500 m E	52	82	66
8	300 m E	81	68	91
9	500 m SE	19	37	23
10	1000 m S	19	33	19
11	500 m S	20	41	19
12	250 m SW	25	85	25
13	250 m W	49	37	56
14	250 m N	21	39	63
15	500 m W	43	-	62
16	1000 m SW	64	170	63
17	1600 m S	22	44	27
18	1000 m SE	15	29	17
19	1200 m SE	16	22	16
20	2000 m SE	29	51	27
21	3000 m SE	27	45	34
22	5000 m SE	19	37	25
23	8000 m SE	16	29	21
24	5000 m S	67	120	46
25	7000 m SW	17	37	22
26	3000 m S	91	160	56
27	4000 m SW	30	61	45
28	7500 m W	22	35	23
29	5000 m W	-	51	49
30	3000 m W	41	63	40
31	2000 m W	32	58	50
32	1500 m W	27	-	38
33	1000 m W	31	62	68
34	1000 m NW	27	52	29
35	500 m N	38	87	50
36	1000 m NE	19	33	21
37	1500 m N	18	34	-
38	2000 m NW	31	85	29
39	2100 m N	-	-	-
40	5000 m NW	25	39	25
41	5000 m N	53	53	-
Unexposed moss bag		-	-	12

TABLE 32

CONCENTRATIONS OF MAGNESIUM (µg/g) IN MOSS EXPOSED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

Site	Location	Exposure Period July 27 August 27	 August 27 September 27	 September 27 October 26
1	7300 m E	870	970	1,000
2	5000 m E	850	1,000	1,000
3	2900 m E	880	1,100	1,100
4	2000 m E	970	1,500	1,100
5	1600 m E	970	1,700	1,200
6	1000 m E	940	1,800	-
7	500 m E	1,000	2,400	1,500
8	300 m E	2,100	6,500	6,300
9	500 m SE	970	1,100	1,300
10	1000 m S	850	1,100	910
11	500 m S	880	1,500	930
12	250 m SW	1,100	5,900	1,000
13	250 m W	2,400	930	5,400
14	250 m N	1,300	1,800	3,800
15	500 m W	1,900	-	1,400
16	1000 m SW	1,000	1,900	1,400
17	1600 m S	840	900	940
18	1000 m SE	790	900	800
19	1200 m SE	960	960	840
20	2000 m SE	990	990	1,100
21	3000 m SE	910	910	1,000
22	5000 m SE	2,500	3,500	2,800
23	8000 m SE	970	1,000	960
24	5000 m S	1,600	2,000	1,600
25	7000 m SW	800	950	900
26	3000 m S	1,400	2,000	1,900
27	4000 m SW	870	970	960
28	7500 m W	840	1,000	910
29	5000 m W	-	1,100	1,200
30	3000 m W	940	1,300	1,000
31	2000 m W	880	1,500	1,200
32	1500 m W	800	-	1,000
33	1000 m W	940	2,600	2,200
34	1000 m NW	1,200	2,000	1,400
35	500 m N	1,300	2,100	1,700
36	1000 m NE	830	1,000	1,000
37	1500 m N	770	910	-
38	2000 m NW	920	1,300	1,100
39	2100 m N	-	-	-
40	5000 m NW	930	940	980
41	5000 m N	890	950	-
Unexposed moss bag		-	-	850

TABLE 33

CONCENTRATIONS OF MANGANESE (µg/g) IN MOSS EXPOSED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Exposure Period		
Site	**Location**	**July 27 August 27**	**August 27 September 27**	**September 27 October 26**
1	7300 m E	250	300	280
2	5000 m E	260	310	280
3	2900 m E	240	310	280
4	2000 m E	260	280	280
5	1600 m E	250	290	270
6	1000 m E	250	300	-
7	500 m E	260	280	280
8	300 m E	250	270	290
9	500 m SE	260	260	260
10	1000 m S	240	230	260
11	500 m S	250	310	280
12	250 m SW	250	280	280
13	250 m W	260	240	280
14	250 m N	250	260	280
15	500 m W	250	-	280
16	1000 m SW	240	270	280
17	1600 m S	260	270	290
18	1000 m SE	250	310	280
19	1200 m SE	260	300	290
20	2000 m SE	250	290	290
21	3000 m SE	240	280	290
22	5000 m SE	250	280	260
23	8000 m SE	260	310	270
24	5000 m S	250	270	300
25	7000 m SW	260	310	290
26	3000 m S	250	290	300
27	4000 m SW	250	300	280
28	7500 m W	250	310	280
29	5000 m W	-	320	290
30	3000 m W	250	310	280
31	2000 m W	260	310	290
32	1500 m W	250	-	280
33	1000 m W	260	300	280
34	1000 m NW	260	290	280
35	500 m N	260	240	300
36	1000 m NE	260	270	290
37	1500 m N	260	290	-
38	2000 m NW	260	280	290
39	2100 m N	-	-	-
40	5000 m NW	270	270	300
41	5000 m N	250	250	-
Unexposed moss bag		-	-	290

TABLE 34

CONCENTRATIONS OF MOLYBDENUM (µg/g) IN MOSS EXPOSED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Exposure Period		
Site	Location	July 27 August 27	August 27 September 27	September 27 October 26
1	7300 m E	< .5	< .5	.5
2	500 m E	< .5	.9	< .5
3	2900 m E	< .5	< .5	< .5
4	2000 m E	< .5	1.2	< .5
5	1600 m E	.7	.9	< .5
6	1000 m E	< .5	1.2	-
7	500 m E	< .5	.7	< .5
8	300 m E	.7	.9	.7
9	500 m SE	< .5	.7	< .5
10	1000 m S	< .5	.7	< .5
11	500 m S	< .5	1.1	< .5
12	250 m SW	< .5	1.5	< .5
13	250 m W	.9	< .5	.8
14	250 m N	< .5	.6	< .5
15	500 m W	.9	-	< .5
16	1000 m SW	.5	.9	< .5
17	1600 m S	< .5	.7	< .5
18	1000 m SE	< .5	.5	< .5
19	1200 m SE	< .5	< .5	< .5
20	2000 m SE	< .5	.6	< .5
21	3000 m SE	< .5	.8	.5
22	5000 m SE	.7	1.2	.5
23	8000 m SE	< .5	.8	< .5
24	5000 m S	.7	1.1	.6
25	7000 m SW	.7	< .5	< .5
26	3000 m S	.6	2.0	.6
27	4000 m SW	< .5	< .5	< .5
28	7500 m W	< .5	.9	< .5
29	5000 m W	-	1.5	.6
30	3000 m W	< .5	.8	< .5
31	2000 m W	< .5	.7	< .5
32	1500 m W	< .5	-	< .5
33	1000 m W	< .5	1.5	< .5
34	1000 m NW	< .5	.9	< .5
35	500 m N	< .5	.7	1.1
36	1000 m NE	< .5	< .5	.6
37	1500 m N	< .5	< .5	-
38	2000 m NW	.6	< .5	.6
39	2100 m N	-	-	-
40	5000 m NW	< .5	< .5	.5
41	5000 m N	< .5	< .5	-
Unexposed moss bag		-	-	.5

TABLE 35

CONCENTRATIONS OF NICKEL (µg/g) IN MOSS EXPOSED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

Site	Location	Exposure Period July 27 August 27	 August 27 September 27	 September 27 October 26
1	7300 m E	2	3	2
2	5000 m E	2	2	2
3	2900 m E	2	3	2
4	2000 m E	2	3	2
5	1600 m E	2	4	2
6	1000 m E	4	5	-
7	500 m E	4	7	5
8	300 m E	5	4	6
9	500 m SE	3	3	4
10	1000 m S	2	3	2
11	500 m S	2	4	2
12	250 m SW	3	4	3
13	250 m W	4	2	4
14	250 m N	3	3	4
15	500 m W	3	-	3
16	1000 m SW	2	3	2
17	1600 m S	2	2	2
18	1000 m SE	2	2	2
19	1200 m SE	2	2	2
20	2000 m SE	2	2	2
21	3000 m SE	2	2	2
22	5000 m SE	2	2	2
23	8000 m SE	2	2	2
24	5000 m S	3	2	3
25	7000 m SW	1	2	2
26	3000 m S	2	3	3
27	4000 m SW	1	2	2
28	7500 m W	2	2	2
29	5000 m W	-	2	2
30	3000 m W	2	3	2
31	2000 m W	2	2	2
32	1500 m W	2	-	2
33	1000 m W	2	3	3
34	1000 m NW	2	3	4
35	500 m N	7	11	24
36	1000 m NE	2	3	3
37	1500 m N	2	2	-
38	2000 m NW	2	2	2
39	2100 m N	-	-	-
40	5000 m NW	2	2	2
41	5000 m N	2	3	-
Unexposed moss bag		-	-	2

TABLE 36

CONCENTRATIONS OF SELENIUM (µg/g) IN MOSS EXPOSED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Exposure Period		
Site	Location	July 27 August 27	August 27 September 27	September 27 October 26
1	7300 m E	.11	.43	.45
2	5000 m E	.45	.50	.45
3	2900 m E	.28	.36	.36
4	2000 m E	.45	.43	.45
5	1600 m E	.37	.50	.45
6	1000 m E	.28	.30	-
7	500 m E	.37	.30	.27
8	300 m E	.37	.30	.27
9	500 m SE	.28	- x -	.27
10	1000 m S	.37	- x -	.27
11	500 m S	.45	.30	.27
12	250 m SW	.37	.36	.27
13	250 m W	.28	.50	.19
14	250 m N	.37	.50	.27
15	500 m W	.28	-	.19
16	1000 m SW	.37	.50	.36
17	1600 m S	.20	.43	.27
18	1000 m SE	.20	.43	.27
19	1200 m SE	.20	.43	.19
20	2000 m SE	.33	.43	.27
21	3000 m SE	.37	.43	.45
22	5000 m SE	.45	.36	.36
23	8000 m SE	.37	.36	.36
24	5000 m S	.45	.30	.27
25	7000 m SW	.28	.30	.45
26	3000 m S	.37	.36	.45
27	4000 m SW	.37	.23	.45
28	7500 m W	.28	.23	.27
29	5000 m W	-	.30	.27
30	3000 m W	.45	.36	.27
31	2000 m W	.45	.36	.27
32	1500 m W	.28	-	.27
33	1000 m W	.28	.36	.45
34	1000 m NW	.28	.43	.36
35	500 m N	.28	.45	.53
36	1000 m NE	.28	.43	.45
37	1500 m N	.28	.30	-
38	2000 m NW	.37	.30	.36
39	2100 m N	-	-	-
40	5000 m NW	.28	.30	.36
41	5000 m N	.37	.23	-
Unexposed moss bag		-	-	27

- x - = Exhausted sample

TABLE 37

CONCENTRATIONS OF SODIUM (µg/g) IN MOSS EXPOSED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Exposure Period		
Site	**Location**	**July 27 August 27**	**August 27 September 27**	**September 27 October 26**
1	7300 m E	28	27	64
2	5000 m E	44	28	83
3	2900 m E	50	27	76
4	2000 m E	48	25	96
5	1600 m E	52	22	82
6	1000 m E	45	22	-
7	500 m E	45	28	83
8	300 m E	88	56	190
9	500 m SE	64	18	100
10	1000 m S	46	13	48
11	500 m S	54	30	78
12	250 m SW	53	110	85
13	250 m W	110	17	130
14	250 m N	87	27	110
15	500 m W	89	-	100
16	1000 m SW	58	31	110
17	1600 m S	57	20	77
18	1000 m SE	45	20	59
19	1200 m SE	92	57	66
20	2000 m SE	76	20	80
21	3000 m SE	56	21	81
22	5000 m SE	350	68	180
23	8000 m SE	67	27	68
24	5000 m S	150	37	140
25	7000 m SW	60	19	65
26	3000 m S	76	38	120
27	4000 m SW	60	19	75
28	7500 m W	36	17	72
29	5000 m W	-	28	98
30	3000 m W	48	25	75
31	2000 m W	50	31	74
32	1500 m W	47	-	65
33	1000 m W	51	24	98
34	100 m NW	63	26	85
35	500 m N	110	26	150
36	1000 m NE	51	23	82
37	1500 m N	50	24	-
38	2000 m NW	53	28	73
39	2100 m N	-	-	-
40	5000 m NW	42	20	63
41	500 m N	22	23	-
Unexposed moss bag		-	-	99

TABLE 38

CONCENTRATIONS OF SULPHUR (%) IN MOSS EXPOSED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

		Exposure Period		
Site	**Location**	**July 27 August 27**	**August 27 September 27**	**September 27 October 26**
1	7300 m E	.06	.06	- x-
2	500 m E	.07	.06	.15
3	2900 m E	.08	.06	.13
4	200 m E	.11	.07	.15
5	1600 m E	.09	.06	.14
6	1000 m E	.08	- x-	-
7	500 m E	.08	.08	.13
8	300 m E	.12	.10	.35
9	500 m SE	.11	.05	.16
10	1000 m S	.09	.06	.11
11	500 m S	.10	.07	.16
12	250 m SW	.10	.13	- x-
13	250 m W	.13	.06	- x-
14	250 m N	.10	.07	.10
15	500 m W	.10	-	.26
16	1000 m SW	.08	.08	- x -
17	1600 m S	.08	.06	- x -
18	1000 m SE	.08	.05	.09
19	1200 mi SE	.08	.08	.12
20	2000 m SE	.08	.06	.14
21	3000 m SE	.09	- x -	.14
22	5000 m SE	.13	.09	.21
23	8000 m SE	.09	.06	.15
24	5000 m S	.13	.08	.18
25	7000 m SW	.07	.05	.12
26	3000 m S	.09	.07	- x -
27	4000 m SW	.07	.07	.13
28	7500 m W	.06	.06	- x -
29	5000 m W	-	.07	.17
30	3000 m W	.08	.05	.11
31	2000 m W	.07	.08	.13
32	1500 m W	.07	-	- x -
33	1000 m W	.08	.07	- x -
34	1000 m NW	.10	.07	.13
35	500 m N	.10	.09	.17
36	1000 m NE	.08	.06	.12
37	1500 m N	.07	.06	-
38	2000 m NW	.07	.06	.11
39	2100 m N	-	-	-
40	5000 m NW	.07	.03	11
41	5000 m N	.06	.06	-
Unexposed moss bag		-	-	.06

- x - = Exhausted sample

TABLE 39

CONCENTRATIONS OF VANADIUM (μg/g) IN MOSS EXPOSED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

Site	Location	Exposure Period		
		July 27 August 27	August 27 September 27	September 27 October 26
1	7300 m E	2	3	3
2	5000 m E	2	3	3
3	2900 m E	2	< 1	3
4	2000 m E	3	3	3
5	1600 m E	2	3	3
6	1000 m E	2	3	-
7	500 m E	2	4	3
8	300 m E	3	4	5
9	500 m E	2	3	3
10	1000 m S	2	3	3
11	500 m S	2	3	3
12	250 m SW	3	4	3
13	250 m W	4	3	5
14	250 m N	3	3	4
15	500 m W	3	-	3
16	1000 m SW	2	3	3
17	1600 m S	2	3	2
18	1000 m SE	2	3	2
19	1200 m SE	2	3	2
20	2000 m SE	2	3	2
21	3000 m SE	3	3	3
22	5000 m SE	3	4	3
23	8000 m SE	3	3	3
24	5000 m S	3	4	3
25	7000 m SW	2	2	2
26	3000 m S	3	4	4
27	4000 m SW	2	2	3
28	7500 m W	2	3	2
29	5000 m W	3	3	3
30	3000 m W	2	3	3
31	2000 m W	2	3	3
32	1500 m W	2	-	2
33	1000 m W	2	3	3
34	1000 m NW	2	3	3
35	500 m N	3	3	3
36	1000 m NE	2	2	3
37	1500 m N	2	2	-
38	2000 m NW	2	3	3
39	2100 m N	-	-	-
40	5000 m NW	2	2	3
41	5000 m N	2	3	-
Unexposed moss bag		-	-	3

TABLE 40

CONCENTRATIONS OF ZINC (µg/g) IN MOSS EXPOSED IN THE VICINITY OF VICTORIA HOSPITAL IN LONDON, ONTARIO, 1984

Site	Location	Exposure Period		
		July 27 August 27	August 27 September 27	September 27 October 26
1	7300 m E	100	200	44
2	5000 m E	37	51	37
3	2900 m E	35	50	40
4	2000 m E	38	120	59
5	1600 m E	69	68	66
6	1000 m E	58	71	-
7	500 m E	66	94	88
8	300 m E	110	180	110
9	500 m SE	24	34	58
10	1000 m S	24	34	28
11	500 m S	37	110	31
12	250 m SW	69	170	48
13	250 m W	59	60	87
14	250 m N	96	150	54
15	500 m W	36	-	63
16	100 m SW	64	91	62
17	1600 m S	58	140	200
18	1000 m SE	23	34	27
19	1200 m SE	22	29	29
20	2000 m SE	37	59	35
21	3000 m SE	220	650	600
22	5000 m SE	33	42	37
23	8000 m SE	37	76	140
24	5000 m S	87	220	68
25	7000 m SW	28	39	30
26	3000 m S	57	85	60
27	4000 m SW	32	40	39
28	7500 m W	160	270	120
29	5000 m W	-	400	400
30	3000 m W	36	45	39
31	2000 m W	70	120	88
32	1500 m W	61	-	77
33	1000 m W	45	84	81
34	1000 m NW	64	170	86
35	500 m N	230	690	820
36	1000 m NE	150	160	120
37	1500 m N	110	220	-
38	2000 m NW	120	120	330
39	2100 m N	-	-	-
40	5000 m NW	72	89	69
41	5000 m N	63	140	-
Unexposed moss bag		-	-	28

TABLE 41

STATISTICAL SUMMARY OF TREE DATA FROM PERMANENT PLOT WESTMINSTER POND/POND MILLS CONSERVATION AREA, LONDON, ONTARIO, 1984

Species	Number Stems in Plot (400m^2)	Number of Stems/ Hectare	Average Height (m)	Basal Area in Plot (cm^2)	Basal Area/ Hectare (m^2)	Mean Rating of Tree Condition	Percent of Total Stems	Percent of Total DBH	Basal Area of Dead Trees (cm^2)	Number of Dead Trees in Plot	Age of Largest Tree (years)
American Beech	6	150	13.2	1,057	2.6	9.5	9.2	7.1			63
Basswood	1	25	20.2	1,058	2.6	11.0	1.5	7.1			
Black Cherry	4	100	17.0	1,328	3.3	10.0	6.2	8.9			
Ironwood	10	250	11.5	795	2.0	10.7	15.4	5.3	75	2	
Shagbark Hickory	1	25	17.1	201	0.5	9.0	1.5	1.4			68
Sugar Maple	24	600	10.9	3,011	7.5	9.8	36.9	20.2	40.7	1	75
White Ash	19	475	20.7	7,428	18.6	19.7	29.2	49.9	676	6	58
Total	65	1,625	15.8	14,878	37.1	11.3	100	100	792.7	9	

TABLE 42

PERCENT VEGETATION COVER BY SPECIES AND CANOPY LAYER IN THE PERMANENT PLOT ESTABLISHED IN THE WESTMINSTER PONDS/POND MILLS CONSERVATION AREA

				Trees	
Species	**Herbs**	**Seedlings**	**Shrubs & Saplings**	**Under story**	**Over-story**
Alliaria petiolata	2.5				
Circaea quadrisulcata	2.5				
Epactus heliborine	4.3				
Euonymus obovatus	3.8				
Solidago flexilcaulis	5.0				
Viloa septentrionalis	3.0				
Acer saccharum		3.3	27.7	19	63.5
Carpinus caroliniana				15	26.5
Caryo ovata		2.5			
Fagus grandifolia			11.5	14	
Fraxinus americana		9.0			16.5
Prunus pensylvanica		2.9	2.5		
Rubus idaeus		3.0			
Quexcus rubra		.8			
Tilia americana		2.8			
Total Cover	21.1	24.0	41.7	48	105.5

TABLE 43

ANALYTICAL RESULTS FOR SOIL COLLECTED AT PIT NEAR PERMANENT VEGETATION PLOT IN THE WESTMINSTER PONDS/POND MILLS CONSERVATION AREA, 1984

				Particle Size										Exchangeable Cations				Metals				
Horizon	Depth (cm)	pH (H_2O)	pH ($CaCl_2$)	% Sand	% Silt	% Clay	C.E.C. me/100g	O.C. %	Total N (mg/g)	$CaCO_3$ %	1 SO_4 (ug/g)	2 Fe_D+Al_D %	3 Fe_p+Al_p %	Ca (ug/g)	Mg (ug/g)	K (ug/g)	Al (ug/g)	Cu	Ni	Pb	Zn	Al
Ah/Ae	0-10	6.7	6.0	38	42	20	14	3.8	1.90	<0.04	8.1	0.78	0.320	2,500	181	190	-	20	23	8.2	80	15
Bt	10-20	4.9	3.8	18	40	41	14	1.1	0.60	-	13	2.00	0.420	1,400	120	55	410	31	31	5.8	75	-
Bmk	20-50	8.4	7.7	7	32	61	17	0.49	0.50	16	15	1.09	0.036	3,300	94	78	-	28	27	5.3	70	-
Ck	50-70+	8.4	7.6	7	35	57	18	0.36	0.40	.23	16	1.00	0.028	3,200	110	76	-	12	14	24.0	75	.08

1. SO_4 - water extractable sulphate

2. Fe_D + Al_D - dithionite extractable iron + dithionite extractable aluminum

3. Fe_p + Al_p - pyrophosphate - extractable iron + pyrophosphate extractable aluminum

APPENDIX

APPENDIX: Criteria Used to Evaluate the Condition of Trees in the Permanent Plot

Tree Condition/Description

Woodlot owned by: ____________________

Tree is: permanent observation plot
sampled tree

1. Tag No. ____________ 2. Species: ____________

3. Height (m): ____________ 4. Diameter (above marker, cm) ______

5. Status: CODOM ○ DOM ○ UNDERSTORY ○

6. Site: Hilltop ☒ Bottomland ○ Slope ○

Aspect: N ☒ E ○ S ○ W ○

FOLIAR CONDITION

7. leaves normal size (1) ☒
leaves undersize (2) ○

8. foliage is healthy deep green colour (1) ○
" " slightly chlorotic (2) ○
" " very chlorotic (3) ○

9. less than 10% of foliage chlorotic (4) ○
1/3 " " " (6) ○
2/3 " " " (8) ○
virtually all foliage chlorotic (10) ○

Twig Dieback

10. no twig dieback (1) ○
some twig dieback at top of crown (2) ○
some twig dieback at side of crown (2) ○
twig dieback all over crown (4) ○

Branch Dieback

11. no dead branches (1) ☒
less than 10% of the branches dead (2) ○
1/3 of the branches dead (4) ○
2/3 of the branches dead (6) ○
allmost all of the branches dead (8) ○

Trunk:

12. sound trunk (1) ☒

13. obvious wounds: mechanical scar (2) ○
frost crack (2) ○

14. Pathogenisity: canker (3) ○
fruiting body (3) ○
bleeding/weeping wound (3) ○

Other Observations (not accumulative)

15. Tapholes present ○ not present ○
○ tap holes heel satisfactorily
○ tap holels heel slowly or not at all

16. foliar insect feeding observed ○ ○ not observed
○ insect feeding significant
○ insect feeding not significant

17. bole feeding insect observed ○ ○ not observed
○ numbers significant
○ numbers not significant

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